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A National Newspaper for Every Branch of the Industry

Automotive Daily News

CARS · SHOP EQUIPMENT · TRUCKS · AVIATION · PARTS · ACCESSORIES · TIRES

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JUN 5 1930
DETROIT

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VINCENT BENDIX TO HEAD S. A. E.

Ban on Finance Company Paper by Reserve Board Hurts Automobile Sales

Continuation of "Archaic" Policy Makes It Harder For Dealers to Get Money for Their Needs, Says C. C. Hanch

CHICAGO, May 29.—A part of the depression registered in that most closely watched of all prosperity barometers, the automobile production record, is directly due, this year, to archaic regulations prohibiting the acceptance of finance company paper by Federal Reserve Banks, according to C. C. Hanch, general manager of the National Association of Finance Companies.

"Despite the stock market gyrations of recent months, and the marked reduction in automobile output, total retail sales are holding up better than is generally realized," said Mr. Hanch. "While factory production has been on low gear, dealers have been selling off the overstock of new and used cars with which they entered the year and there has been no noticeable increase in defaults, repossessions and delinquencies.

"The troubles facing automobile dealers come this year, not alone from hesitancy of the public to buy cars, but in part from the difficulties experienced by both dealers and finance companies in obtaining sufficient funds from banks to handle the business offered them. The objection of banks to finance company paper, at present, is that it is not eligible for rediscount at the Federal Reserve Banks. In such times as these, when banks are naturally anxious to have as much eligible paper as possible in their portfolios, it would be strange if they did not give a preference to such paper as would be available for rediscount.

"When the Federal Reserve Board originally ruled against the rediscount of automobile finance company notes the soundness of such notes had not been demonstrated. In the twelve years which have elapsed since the Federal Reserve policy was set, much favorable experience has accumulated and finance company paper has become established as one of the safest forms of commercial paper in which banks can invest.

"The best contribution toward continued national prosperity which can be made now in the automobile field is the continued urging on the

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GRAHAM-PAIGE BODY CORP. PLANS BIG JUNE SCHEDULE

Evansville, Ind., May 29.—Business demand would indicate that the present operating force of 900 people at the local plant of the Graham-Paige Body Corporation will continue through the month of June, according to J. W. Evans, factory manager.

The factory will begin initial production next week of the two-passenger sedan body style.

Will Head S. A. E.

VINCENT BENDIX, president of the Bendix Aviation Corporation, who has been nominated as president of the Society of Automotive Engineers, has the distinction of being the largest manufacturer of practically every kind of automotive braking system perfected to date. Through re-

(Continued on Page 4)

SLOAN, OVERSEAS OFFICIALS OF G. M. C. ATTACK TARIFF

NEW YORK, May 29.—That the Hawley-Smoot tariff measure is in no sense founded upon sound business policies and that its failure would have a helpful influence on America's world trade, is the opinion expressed by Alfred P. Sloan, president, General Motors Corporation, in adding his protest to the rising tide of opposition among the commercial leaders of the nation.

At the same time forty-nine General Motors overseas officials, stationed in fifteen different countries, given full authority by their firm to express without equivocation their reactions to the tariff bill, have within the past few days sent a total of 106 messages of protest to senators, representatives and President Hoover.

"There can be no disagreement on the fundamental fact that the economic position of the United States has completely changed during the past two decades," says Mr. Sloan, adding, "this makes it essential that we should modify our fiscal policies in harmony with the altered set of circumstances that now exist. This is particularly true of our tariff policy.

"The commercial relationships of the various countries of the world are extremely complicated. As a creditor nation, relatively large amounts are due us yearly from overseas countries in interest charges and returns on investments, increasing the necessity of overseas trade.

"The productivity of our indus-

(Continued on Page 2)

OTHER OFFICERS NOMINATED AT FRENCH LICK GATHERING

Choice of Mr. Bendix Received With Enthusiasm By Engineers at Twenty-fifth Anniversary Celebration

By A. LUDLOW CLAYDEN

FRENCH LICK, Ind., May 29.—Nomination of Vincent Bendix, president of the Bendix Aviation Corporation, for president of the Society of Automotive Engineers for the coming year was received with enthusiasm when announced here last night at the society's celebration of its twenty-fifth anniversary.

The celebration was held as a feature of the annual summer meeting of the society being held here this week.

The nomination of Mr. Bendix was announced by E. P. Warner, president, who also made known the other nominations reported by the nominating committee at this time. Others are to be announced later.

G. V. Lewis was nominated as vice-president for aircraft, Arthur Nutt, vice-president for aircraft engines; J. A. Warner, vice-president for passenger cars; C. B. Parsons, vice-president for bodies, and F. K. Glynn, vice-president for transportation.

F. S. Duesenberg, Norman G. Shidle and C. L. Tilson were nominated as counsellors and C. D. Spicer was nominated as treasurer.

Only one nomination was made for each office and the nominations are tantamount to election.

A speaker at the meeting in celebration of the society's twenty-fifth aniversary was Alvan Macauley, president of the National Automobile Chamber of Commerce and president of the Packard Motor Car Company. Unable to be present at the meeting, Mr. Macauley gave his address by radio from Detroit.

Mr. Macauley complimented the engineers, declaring that everything the automotive industry was today it owed to the work of these men. He predicted, however, that twenty-five years from now the airplane will have replaced the automobile as the principal factor in transportation and he said he hoped for an everlasting continuance of the engineering sportsmanship thus far displayed by the technical men in the industry.

After Mr. Macauley's talk, the floor was taken by Col. Alden, A. L.

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BORG-WARNER MAY TOP APRIL OUTPUT IN MAY'S BUSINESS

Chicago, May 29.—May business of Borg-Warner Corporation will equal if not exceed that of April, according to C. S. Davis, president. April was the best month experienced by the company thus far in the current year.

It is too early, said Mr. Davis, to make any definite statement as to what can be expected in the third quarter in the industry as a whole, but I can state definitely that in my opinion the final quarter of 1930 will be much better than were the last three months of 1929.

Present indications are that our Norge mechanical refrigerator will add considerably to our profits throughout the balance of 1930. Orders on hand for refrigerators at the present time are far in excess of capacity of our manufacturing plant. In May for the first time our refrigerator business will show a profit after charging off for the month all development and tooling expenses.

WAUKESHA MOTOR GETS BIG TRACTOR ENGINE ORDER

Waukesha, Wis., May 29.—An order for $500,000 in tractor engines for delivery this summer has been announced by Harry L. Horning, president of Waukesha Motors Company. Business for the last four months has remained on a favorable level as compared with last year, according to Mr. Horning.

Gasoline Sales in March Show Increase Over 1929

New York, May 29.—Gasoline consumption in 43 states for March, as indicated by reports of dealers and wholesalers in states having gasoline tax or inspection laws, averaged 25,959,000 gallons a day, compared with 24,234,000 gallons daily in March, last year, an increase of 7.1 per cent. Consumption in February totaled 23,768,000 gallons daily.

During the first quarter, consumption in these states averaged 23,767,000 gallons a day, compared with 21,284,000 daily in last year's first quarter, and represented a daily average gain of 11.7 per cent.

In New York state, consumption in March averaged 3,361,452 gallons daily, an increase of 301,631 gallons over daily average for February. Daily average consumption in Illinois in March was 2,224,742 gallons, a gain of 214,135 gallons over daily consumption in the previous month.

First quarter consumption in California, Montana and Pennsylvania was higher than in the 1929 first quarter, but all three states showed decreases compared with consumption during the final 1929 quarter.

Of the forty-three states, Indiana, Michigan, Nebraska, Nevada, North Dakota, Vermont and Wyoming reported decreased consumption in March, compared with March, 1929; North Carolina's consumption in March, while showing a gain over previous March, was less than in February, and Michigan and Nebraska reported decreased consumption during the first quarter, against last year's first quarter period.

TODAY

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Scrapping of Old Cars In 1930 Put at 2,500,000

NEW YORK, May 29.—On the basis of information now available, it is estimated that the scrapping of old automobiles in the United States this year will reach at least 2,500,000, as compared with 2,617,000 in 1929 and 2,416,000 in 1928. While this decline in the junking of old cars would appear to be smaller than the decline in public buying, this is accounted for by the intensive campaign among manufacturers and dealers to clear the roads of as many old cars as possible.

The scrapping of these cars gives the manufacturers a market base of at least 2,500,000 in the United States alone and this replacement demand constitutes one of the most favorable factors in the industry. Few automobiles are owned that are considered by their owners as necessities and the scrapping of a car means a new sale in practically every case.

The replacement demand for cars in the United States has had a remarkable growth in the past few years and would normally have reached 3,000,000 in the current year and may still do so. It will be recalled that the replacement market in 1927, a year of declining sales, the replacement demand showed a substantial increase. The same may be true this year. The campaign of the manufacturers is expected to result in the scrapping of 400,000 cars.

Manufacturing of cars for replacements has more than doubled since 1924 and in the years preceding 1924 the rate of increase was

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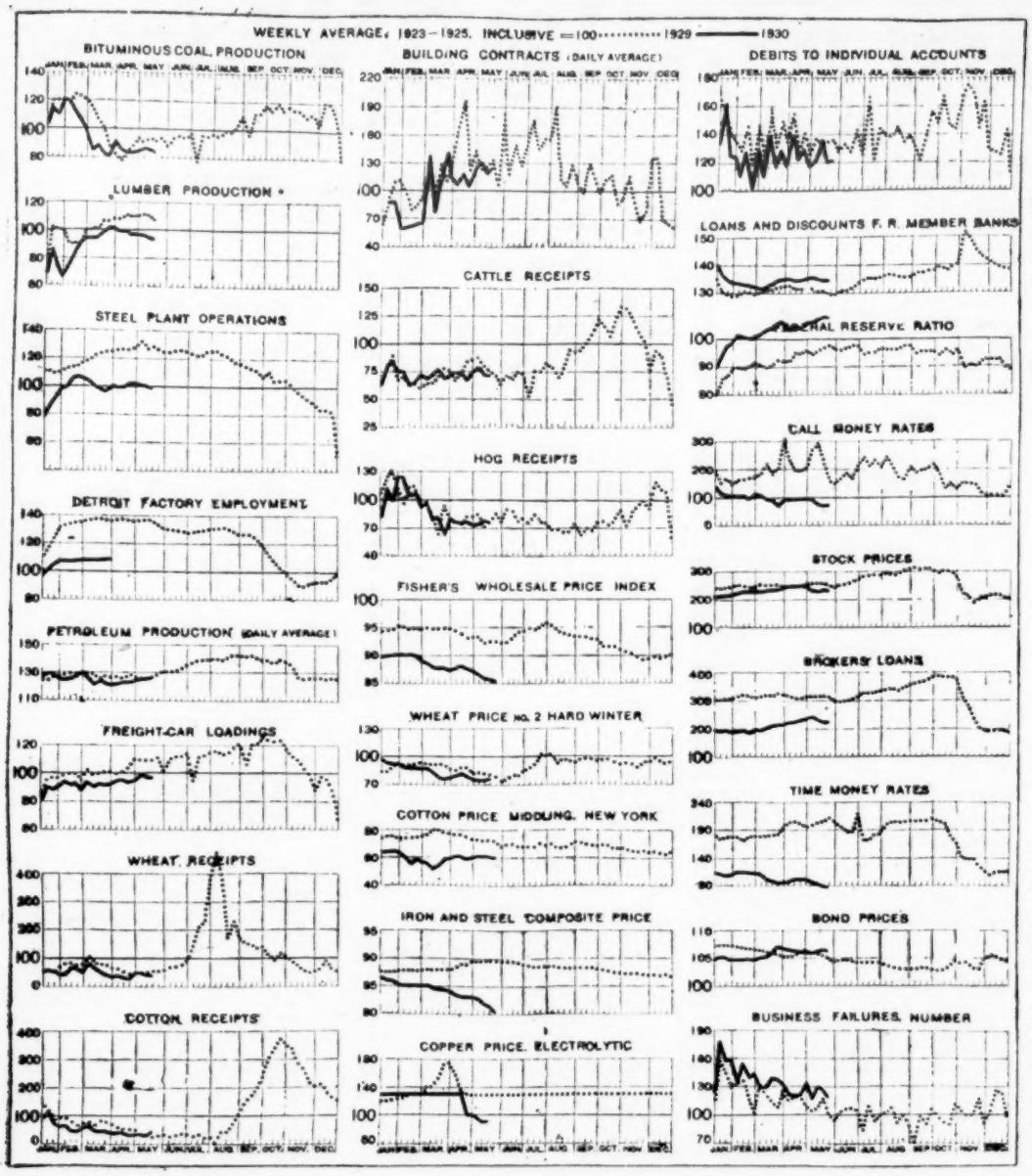
U. S. Charts Week's Business Progress



Above is reproduced this week's chart of business trends issued yesterday by the Department of Commerce at Washington. These charts are now appearing regularly in Automotive Daily News.

SLOAN SEES TARIFF BLOW TO U. S. TRADE

(Continued from Page 1)

trial organizations due to labor-saving machinery and increase of facilities, has been greatly expanded in recent years. Higher efficiency in production per man-hour and the so-called technological unemployment factor adds its influence. All these factors and other, which I have not mentioned, should make us realize that additional restrictions, in the way of raising the height of the tariff wall, in principle introducing barriers in the currents of our world trade, are bound to have an adverse influence on our domestic prosperity, reducing our ability to produce, hence adding to unemployment.

"I feel that the failure of the proposed tariff bill would have a helpful influence. It would serve notice to the world at large that the United States recognizes the important principle that it must buy if it is to sell."

Typical of the expressions from General Motors overseas officials is the cablegram of E. M. Van Voorhees, managing director, General Motors, Brazil, to Senator Copeland: "Today more than ever we must break down any tendency toward economic insulation as well as preserve our balance of trade. In Brazil, especially, good will and friendly economic liaison will receive a serious blow if the tariff bill is passed."

"Not only will American capital invested abroad and at home be placed in jeopardy through direct retaliation on the part of every country affected, but more important, we will have lost the good will of the world and consolidated a growing enmity which must isolate us with resultant serious consequences," cables Edward Jenkins, European regional finance manager, Paris, to Senator Vandenburg, Michigan.

From Wellington, New Zealand, L. L. King, works manager, informs Senator Vandenberg, "An agitation against American goods is already rife; passing of the bill must bring about retaliation with possible prohibition of importation of American motor cars."

REPLACEMENT DEMAND SHOWS FAST GROWTH

(Continued from Page 1)

more rapid than in the years since. The replacement demand in 1924, according to figures of the National Automobile Chamber of Commerce, amounted to 1,142,834, while in 1929, the total was 2,800,000.

The automotive industry has reached a place where the replacement demand constitutes what was more than a normal annual production ten years ago. For instance, in 1920 the total production in the United States was 2,227,349, a figure that certainly would constitute an extremely conservative estimate of the replacement demand for 1930. In 1920, however, the replacement demand was only 353,939.

The following table shows the growth of production and the accompanying increase in the replacement demand for the years from 1920 to 1929, inclusive, as compiled by the National Automobile Chamber of Commerce:

	Production	Replacements
1920	2,227,349	353,939
1921	1,616,119	482,829
1922	2,544,176	794,956
1923	4,034,012	877,143
1924	3,602,540	1,142,834
1925	4,265,830	1,670,327
1926	4,300,934	1,832,767
1927	3,401,326	2,110,223
1928	4,358,748	2,516,874
1929	5,358,414	2,800,000

SHELDON CONFERS WITH WILLYS COAST OFFICIALS

Los Angeles, May 29.—J. A. Sheldon, works manager for the Willys-Overland, Inc., Toledo, O., and vice-president of the Willys-Overland-Pacific Company, here, recently arrived in Los Angeles to confer with local Willys-Overland factory officials.

WILCOX-RICH OFFICERS PUT ON EATON BOARD

Cleveland, May 29.—At a stockholders' meeting of the Eaton Axle and Spring Company, C. H. L. Flinterman, president of Wilcox-Rich Corporation, and Carlton M. Higbie, chairman of board of Wilcox-Rich, were added to the board of directors. Other directors were re-elected.

Mr. Higbie, J. O. Eaton and E. B. Green were elected as members of finance committee.

More than 85 per cent. of the Wilcox-Rich Corporation stock has been turned in for exchange for Eaton Axle stock, J. O. Eaton, chairman of the board, announced.

Date of deposit of Wilcox-Rich stock has been extended to June 5.

SERVEL REPORTS PROFIT OF $10,610 IN QUARTER

New York, May 29.—Servel, Inc., reports for the quarter ended March 31, 1930, net profit of $10,610 after interest, Federal taxes, etc. Gross sales for the quarter were $2,743,328. Capital stock on December 31, 1929, consisted of $909,400 7 per cent. preferred and 1,753,238 shares of no-par common.

Balance sheet as of March 31, last, shows cash and call loans of $1,027,606. Current assets amounted to $6,177,878 and current liabilities $921,728.

DIVIDEND DECLARED BY ELECTRIC AUTO-LITE CO.

Toledo, O., May 29.—The board of directors of the Electric Auto-Lite Company have declared a quarterly dividend of $1,422,397, payable July 1 to stockholders of record June 14. The dividend will be paid at the rate of $1.75 per share for 41,602 shares of preferred stock and $1.50 per share for 899,129 shares of common.

THOMPSON PRODUCTS FORMS AERONAUTICS DIVISION

Cleveland, May 29.—Continued large production of aircraft valves with prospects of greater growth in the future has made it advisable to organize an aeronautics division of Thompson Products, Inc.,

SPARKS from DETROIT

A Pioneer Dies

* * *

G. M. Truck to Expand

* * *

Diesels for Cars

Fred Kingsbury—Detroit Editor

HORACE M. JEROME, a pioneer in the industry, died a few days ago at his home in Ann Harbor, Mich. Since 1925 he had been chief engineer of the United States Pressed Steel Company. He was one of the charter members of the Society of Automotive Engineers, and at one time was chief engineer of the Chalmers Motor Company. For the last four years he had been associated with Gar Wood in experimental work on combustion engines.

Mr. Jerome was a Spanish War veteran and during the World War was engaged in the manufacture of ordnance at a Rock Island, Ill., plant.

* * *

PAUL W. SEILER is again expanding the General Motors Truck plant at Pontiac, Mich., and has awarded contracts for a $250,000 addition to the engineering and warehouse divisions. The work is to be completed in sixty days. When the original plant was built a few years ago, all records for construction were broken.

* * *

There has been much discussion recently regarding the application of Diesel engines to motor cars. Alvan Macauley, president of the Packard Motor Car Company, in commenting on these rumors, so far as Packard is concerned, said: "There is no truth in this rumor. We never have believed, and do not now believe, that the Diesel principle is adaptable to passenger cars."

* * *

AUTOMOBILE men are wondering what the General Spring Bumper Company, a division of the Houdaille-Hershey Corporation, has up its sleeve. It is reported that the company has obtained a new type bumper which should increase the company's volume during the next twelve months by a million units. It also is reported that the new accessory can be manufactured on a large scale using the present mechanical equipment.

* * *

HENRY FORD'S home city, Dearborn, Mich., has erected display signs at the six principal gateways of that thriving municipality, bearing the city's name. The signs are 6x9 feet and are illuminated at night.

* * *

William Holler, regional manager of the Mid-East region for the Chevrolet Motor Company, with headquarters in Buffalo, has returned there after spending a few days in Detroit. Mr. Holler underwent an operation while in this city.

* * *

D. X. Petrie, now retired from active business and living in Cleveland, arrived in Detroit the other day accompanied by H. O. K. Meister, vice-president of the Hyatt Roller Bearing Company. Mr. Petrie has had some very interesting experiences. He was employed by the Buick Motor Company, when its plant consisted of one small building. Later he was managing director of General Motors of England, and he is the man who taught Queen Wilhelmina of Holland to drive an automobile. During the late Czar's regime, he won one of the most difficult automobile races ever held in Russia.

* * *

J. E. Casey, general manager of the Detroit Chevrolet Dealers' Association, has been a very busy man for the last two months. He has been supervising the salesmen's school for Chevrolet salesmen. A class of thirty will graduate in a few days and will be taken on a trip to the General Motors Proving Ground at Milford, Mich.

* * *

H. T. THOMAS, vice-president in charge of engineering of the Reo Motor Car Company, is down in French Lick attending the sessions of the Society of Automotive Engineers, and viewing the exhibits of the early cars on display.

Back in 1903, Mr. Thomas, driving the R. E. Olds "Pirate," made a new record of eighty-six miles an hour.

* * *

Officers and men of the United States Army Transport School at Camp Holibird, Maryland, have been in the city several days as the guests of Chrysler, Dodge, De Soto and Plymouth plants. They are piloting a caravan of automobiles and trucks on a six weeks' tour which includes an intensive training period. Methods of manufacturing and production were studied at the various plants.

This Dealer Finds Consistent Advertising Is Best

Studebaker and Pierce-Arrow Distributor in Beaver Falls, Pa., Has Realized Greater Profits Under This System.

By JAMES A. LOCKHART

"DOES newspaper advertising actually pay?" Just put that question up to Thomas F. Daquila, well-known Studebaker and Pierce-Arrow distributor of Beaver Falls, Pa., and you won't have to wait long for your answer. There are hundreds, and probably thousands, of automobile dealers who spend as much or more money in newspaper advertising than Mr. Daquila, but few of them have realized a greater profit from it than he has, proving that it largely depends on the way it is managed.

Inserting a huge advertisement in the local paper once a week and waiting the rest of the time for the prospects to come in is the way too dealers appear to operate.

This successful automobile dealer advertises, not once or twice a week, but every day the paper is published, and he considers such advertising as one of the best business builders an automobile distributor can use.

Not only does newspaper advertising help to build up a business, but it aids materially in holding business, he contends. There are so many makes of automobiles on the market today that many of them are bound to be good cars. The prospective buyer of a new auto, regardless of the price range, can make his choice of a half dozen different names. It is there that newspaper advertising can be used to great advantage by the progressive car dealer in helping to convince the average buyer that a certain make is the best for his money and purpose.

* * *

HOWEVER, much of the possible results from newspaper advertising depends on how the layout of the ad is handled, size of space, publication used, and other similar points. But the most important thing of all, says Mr. Daquila, is consistent advertising day in and day out. Many auto dealers follow the age-old custom of advertising heavily on Friday and forgetting that people read the papers the other days of the week too. Telling the world through the newspapers is the surest way to put your merchandise before the public in a favorable light, but it must be done steadily to bring the best results.

Don't crowd your advertising, this successful dealer says; use plenty of white space and good, clear, easily read announcements that just can't be passed up by the hurried paper reader. In accomplishing this purpose, it is usually best to use a suitable, attractive cut or illustration which will serve to attract the eye to the wording of the ad. Even though ads should not appear crowded, a comparatively small space will sometimes bring better results considering the money invested than a large announcement will.

MR. DAUQILA has been advertising his business in a very modern and progressive way for a number of years, and today his ads cover as much or more newspaper space than ever, but the wording is usually very brief. A substantial size space often contains only the names, Studebaker and Pierce-Arrow, and his own name. And no more need be said. He has educated the entire community, and it is no small one, to the value of the cars he sells through this advertising. He need only mention the cars' names and his own to remind people constantly that he is doing a bigger and better business every day. Another point, he needs only one or two salesmen to make his sales; most of the many car buyers come directly to him, because they have come to know him well through the daily newspaper.

Large amounts of cleverly handled newspaper advertising inspires confidence and trust. This is shown by the fact that thousands of people are personally acquainted with him and other thousands, knowing him through his advertising, are pleased to do business with him without giving his competitors a single thought. The non-advertiser is like an ever-closed book—no one knows anything about him. The advertiser is open to everybody, and the majority of people are led to believe, and rightly so, that he must be doing a progressive business in a progressive way.

There always were and no doubt always will be those business men who refuse to advertise and yet complain of the terrible cut-throat competition and similar troubles, but Mr. Daquila is most certainly not of that type. Instead, he advertises steadily, is increasing his business consistently and lets his competition fight out its own problems without trying to give advice.

* * *

IF those automobile dealers who still contend that money spent on advertising is utterly wasted will only stop and consider the following fact for a moment, they will see why Daquila and other highly successful business men believe in extensive advertising. How is it possible to account for the success of The Automotive Daily News if advertising does not pay? Or any other publication, from your local daily to the huge national weaklies? The automobile makers and automotive parts manufacturers who advertise in this publication do so because it is a simple money making investment, and you can make just as much money as they do in proportion to your investment!

Daquila is only taking advantage of the proven fact that many people today spend more time in reading advertising than they do on the editorial matter of a publication. As a former newspaper advertising manager, this writer found that fact to be true in countless ways, and modern "big business" is cashing in on the situation.

The last point, and perhaps the very best point to remember in progressive advertising, is this: If you advertise consistently and do it well, you will never have to pay for your advertising! I don't mean to infer that you can or even should try to avoid paying your ad bills, but I do mean that if you advertise the man whose business you take pays for that advertising. He pays for it in loss of trade to you.

If you will look at it that way, you can easily see that you can't afford **not** to advertise.

Personal Briefs

Syracuse, N. Y., May 29.—R. J. Purcell, for the past fifteen years connected with the White Company and for some time manager of the Syracuse and Utica branches of that organization, has been appointed manager of truck sales for the Barzee Equipment Company, Federal distributor, with headquarters at 1223 Burnet Ave.

Los Angeles, Cal., May 29.—Herbert Woodward, president of Herbert Woodward, Inc., has announced the appointment of George Riley to the position of assistant sales manager of the Reo Speed Wagon division.

Toledo, O., May 29.—Warren E. Griffith, president of the Landman-Griffith Company here, has resigned his position with the company he founded, to become sales executive for the Airway Electric Appliance Company on the Pacific Coast. Griffith will assume his new duties June 4. The company here will continue to operate under the same name and Griffith will retain his interest in it. Sam Keller, brother of K. T. Keller, vice-president and general sales manager of the Chrysler Corporation, will succeed Griffith as president. Keller has been sales manager of Landman-Griffith.

Lexington, Ky., May 29.—W. Emmet Milward was elected president of the Lexington Automobile Club, Steve B. Featherston, vice-president and Fred Bryant, secretary, at the annual meeting at Hotel Lafayette.

Nashville, Tenn., May 29 (UTPS).—F. Porter Fleming, for 9 years assistant manager of the George Cole Motor Company, Lincoln and Ford dealer, has been named manager of the retail sales department of the R. W. Hartwell Motor Company, Plymouth-Chrysler agency.

Oklahoma, City, May 29.—Frank J. Spexarth has been appointed manager of the Oldsmobile-Viking zone here, it is announced by J. T. Collins, general sales manager of Olds Motor Works.

Newark, N. J., May 29.—E. J. Foley, president of the Foley Chevrolet Company, represented the New Jersey Auto Trade Association at the outing and dinner of the Brooklyn Auto Trade Association at the Queens Valley Golf Club, Forest Hills, L. I.

DEALER DOINGS

Boston, Mass., May 29. — G. E. Mahoney, city sales manager for the Olds Motor Works, announces the addition of the Station Garage, 40 Summer St., Malden, and Leslie T. Haskins, Inc., Crest Road, Wellesley, to the list of Oldsmobile dealers. Both are to render service as well on Oldsmobile and Viking cars. This brings the total of Oldsmobile dealers in metropolitan Boston to twenty.

Spartanburg, S. C., May 29.—With the opening on June 1 of the Broadway Motor Company at 264 East Main St., at the corner of North Dean, this city will have its second Ford automobile dealership. Horace L. Shealy of Prosperity, who has been the Ford dealer in that vicinity for the past eleven years, is president and treasurer of the new firm. He will move his family to Spartanburg within the next few days.

Jamestown, N. Y., May 29.—The Par-Ket Motor Sales, Inc., Chevrolet distributor, with headquarters in Washington Street, has acquired a lease on a vacant lot in West 3d Street, which has been equipped as a used car sales station. The firm reports that the used car lot, located in the heart of the business district, has already proved a boon to sales.

Passaic, N. J., May 29.—The Armory Garage, at 485-495 Main Ave., has been appointed Marmon dealer in this city and vicinity. The local concern is headed by Harry Smith, former Hupmobile dealer. Mr. Smith has been in the automobile business in Passaic for more than ten years.

Dubuque, Ia., May 29.—The Lange & Tscharner Motor Car Company, sales and service for Durant, Auburn and Cord motor cars, has moved into a new home along automobile row at 850 Iowa St.

Doorbell Ringing Sells 97 Used Cars and 28 Trucks

By JULANIE LAMPKIN

LOUIS H. BAKER of Greensboro, Ga., has sold ninety-seven used cars in the last sixty days. These used car sales were made by the regular sales organization, composed of eight men, who at the same time sold twenty-eight used trucks, making a total of 125 sales for the two months, an average of nearly fifteen sales for each salesman.

"We work on the assumption that everybody is a prospect for one of the type of cars we sell," said Mr. Baker. "There's only a few who can't afford to buy a used car at our prices and terms."

Dividing the city and suburbs into territories, and salesmen started out to dig up and close as many prospects as possible during the two months. They called on the people they knew as prospects and closed them wherever possible and then started ringing doorbells. Every here and there they would learn from the houseswife, or some other person who answered the bell, that the purchase of a used car was under consideration. If the husband was not home, the salesman learned when he would be in, so as to call and arrange a demonstration.

"We used a full-page ad in the Sunday paper," said Mr. Baker. "This read: 'A Big Lot of Reconditioned Cars Is Now on Hand at a Reasonable Price. Call to See Us or Drop Us a Card and We Will Call to See You.' This kind of message brought the salesman in contact with several new prospects every day. These salesmen sold fifteen used cars the first two days.

"A tag was attached to every used car on the floor, bearing the price and terms. A car was usually sold on a one-third cash basis, and balance in monthly payments or whatever terms were suitable for the purchaser. The average price was $75 to $350, and when a prospect walked in our building he would not have to ask questions about the price and what terms the car could be bought on."

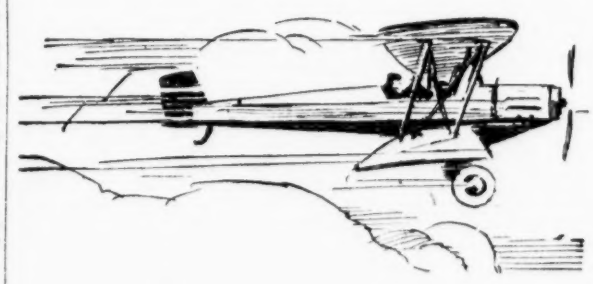
Plans for this drive were outlined by Mr. Baker to the salesmen at a dinner. Each salesman had to keep his own record to show what part of the work he had accomplished at the end of sixty days. Mr. Baker also announced prizes as follows: $50 for the salesman who sold the largest number of cars during the drive; $40 for second, and $25 to each salesman who sold nine cars during the drive. At the close the record showed first prize going to the salesman who sold twenty-one used cars and four trucks.

DE SOTO REPRESENTATIVES ATTEND MEETING IN OMAHA

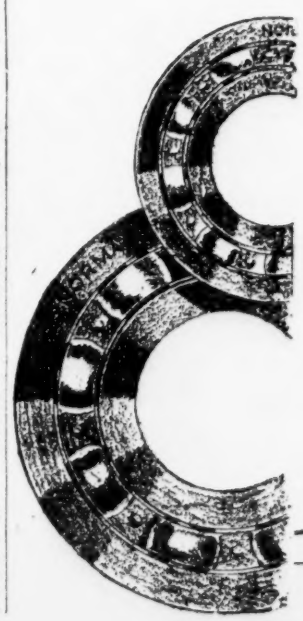
Omaha, Neb., May 29.—A huge dealer meeting of De Soto representatives from Iowa, Nebraska and South Dakota met recently at the Pontenelle Hoted here for the purpose of viewing the new De Soto six line. More than 150 attended and each dealer drove away one of the new models, in accordance with an arrangement made prior to the gathering. They will use the cars as demonstrators until their initial shipments arrive.

L. J. Hannah, sales promotion manager from the plant at Detroit, presided and gave the principal address at the meeting and the banquet. A. E. Voight, district representative of the territory here, was in charge. The complete line of new sixes, including a sedan, coupe, cabriolet coupe, roadster and touring car, was displayed in the lobby of the hotel.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS



NORMA-HOFFMANN
PRECISION BEARINGS



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NORMA-HOFFMANN BEARINGS CORPORATION
Stamford, Conn. U.S.A

Automotive Daily News

"Of, By and For the Entire Automotive Industry"

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Kill the Hawley-Smoot Bill

AT the present time the most serious situation in the commercial life of this country is lack of employment for an important bloc of the people who are anxious to work. Authorities differ as to the exact number of unemployed in the United States today, but one thing is certain, the number is too large.

In their benign wisdom our lawmakers in Washington have framed a tariff measure which seems certain to increase unemployment. Alvan Macauley, president of the National Automobile Chamber of Commerce, forcefully brought this to the attention of the country in his recent statement on the Hawley-Smoot tariff bill, when he said:

"In the motor vehicle industry alone last year, export business provided two months' employment to all the men in the United States producing automobiles, trucks and buses; in addition, earnings of hundreds of thousands of others making commodities for the industry were directly enhanced."

Since the introduction of the Hawley-Smoot measure the Automotive Daily News has been beseeching its readers to realize that this law has an intimate personal meaning for each of them, whether they are manufacturers, dealers, engineers or anything else. If this bill becomes a law, every one of us will feel the effects in his own pocketbook. Passage of the bill will hamstring present efforts to improve the unemployment situation and will probably increase the present number of persons out of work.

Other automotive leaders have registered their opinions of the Hawley-Smoot bill, and we want our readers to note them carefully.

Charles W. Nash says that the proposed tariff "is a great menace to our foreign trade, and it is my belief that all foreign countries where America enjoys a large export business will immediately adopt retaliatory measures against American-manufactured articles, with the result that our export business will suffer materially and will add greatly to our already overburdened unemployment situation. I am of the opinion that sufficient warning has already been given to warrant the present Congress in discontinuing action on the proposed tariff."

Albert Russel Erskine, president of Studebaker, says that the proposed new tariff is "a serious mistake and should not become a law." Mr. Erskine forcefully adds: "It seems incredible that the government at Washington could be guilty of imposing upon American business and consumers, especially in these depressed times, such as an egregious blunder as this tariff bill, yet our sole hope of escape rests in the doubtful possibility of a presidential veto. If this fails us, several years at least of hard times seem inescapable, such is the impractical character of our political machinery."

Wire your senators and representatives today that you are watching their action on the Hawley-Smoot bill and expect protection from this stupid attempt to confer special favors at the expense of the country as a whole.

Truck Registrations

IN a year that has seen most industries lagging behind its records for the same period in 1929, we are filled with admiration for the job that the commercial motor vehicle people are doing.

Sales figures for the month of April are rapidly coming in and they show the motor truck branch of the industry holding close to the records established last year. At the moment we have complete returns for twenty-eight states and the District of Columbia and the totals for those units are only about 16 per cent. under the 1929 figures. Some of the companies actually have exceeded their totals for the same period last year and none of them is showing badly in comparison with that abnormal era. More power to the truck industry.

Here and There in the Trade Headlines— By MacConachie

THE SURVEY ON THE STATUS OF WOMEN DRIVERS REACHES THE GREAT AMERICAN HOME
WOMEN ARE SAFEST DRIVERS FIGURES SHOW
AND HE SAYS I BENT THAT FRONT FENDER EH?
SALES
PRODUCTION
NO DANGER IF THEY STICK CLOSE.
YOU CAN TAKE OFF THE DISGUISE WILBUR 'AN GO BACK TO SELLING CARS, THE SUPREME COURT SAYS WE DONT HAVE TO SPY ON OUR CLIENTS ANY MORE
DEALER
THE SUPREME COURT SAYS THE "REVS" MUST GO SLOW ON SEIZED CARS

BENDIX BIG FACTOR IN BRAKE INDUSTRY

(Continued from Page 1)

cent acquisitions and affiliations, his corporation now manufactures mechanical, hydraulic, air and vacuum brakes, brake boosters and brake testers.

Mr. Bendix first achieved fame as the inventor of the Bendix starter-drive, the connecting link between a self-starter for motors and the flywheel of the engine. From the day this device became a reality the progress of the automobile industry received a great stimulus. The demand for the Bendix drive was instantaneous. There are now approximately 25,000,000 of these drives in use on automobiles and airplanes throughout the world.

While taking care of the fast increasing demand for his drive device, Mr. Bendix realized that after more efficient starting would logically come the more efficient stopping of automobiles and airplanes. He investigated numerous brake systems, but it was not until 1923 on a visit to the Paris Automobile Show that he found a design that held his attention. The mechanism was a four-wheel mechanical brake invented by Henri Perrot, a Frenchman. After a thorough study of the design Mr. Bendix came back to America with the rights to manufacture this four-wheel brake here. Characteristically, he immediately made improvements on the design before introducing the brakes in this country. They became an immediate sensation. Bendix brakes are used on leading makes of motor cars and, in combination with Bendix double-disk wheels, on practically all of the foremost airplanes.

After he had devised means of starting and stopping automobiles and airplanes, and his organization had developed into tremendous proportions with immense plants at South Bend, Ind., and Elmira, N. Y., Mr. Bendix interested himself in devices that would keep these vehicles going. Soon his corporation acquired the Stromberg Motor Devices Company, now called the Bendix Stromberg Carburetor Company, one of the largest manufacturers of carburetors in the country. Stromberg carburetors are standard equipment on many leading automobiles and on more than 95 per cent. of the airplanes manufactured in the United States and abroad.

Subsequently, Bendix interests acquired other prominent automotive and aviation accessory manufacturing concerns. Today the Bendix Aviation Corporation is the leading manufacturer of automobile and airplane equipment in the world, striking evidence of the automotive engineering genius and organizing ability of the man at the helm.

U. S. RUBBER TIRE TEST FLEET GOES TO MICHIGAN

Phoenix, Ariz., May 29.—Having rounded out six months of operations on the sun-baked, gritty lava roads adjacent to this city, the tire test fleet of the United States Rubber Company left here this week for Michigan, where it will continue operations throughout the summer, returning to Arizona again next fall. More than 2,000,000 tire test miles had been piled up here since last November, when the fleet arrived, according to William Thompson, fleet manager.

HANCH RAPS POLICY OF RESERVE BOARD

(Continued from Page 1)

part of automobile finance companies and banks for the admission of finance company paper, under safe and sound limitations, to eligibility for rediscount with the Federal Reserve Banks.

"It is generally conceded by the economic thought of this country that continued industrial prosperity is substantially dependent upon mass production, that the continuity of mass production is directly dependent upon mass consumption and that mass consumption is largely dependent upon consumer credit.

"We predict that business for finance companies, while safe and reasonably satisfactory, will continue in a substantially diminished volume, as compared with what it should be, unless banks adopt a more liberal attitude toward finance company loans. This means that consumer credit and therefore mass consumption and mass production will be restricted, and as a consequence general prosperity will be in a more moderate measure than might otherwise be expected.

"That it is only a matter of time until the Federal Reserve banks grant finance loans their proper place in the credit system is indicated by the recent action of the Bank of England in subscribing two and a half million dollars to enable British finance companies to extend installment credit on a wider scale to buyers of industrial equipment. One of these companies, the United Dominions Trust, Ltd., was once owned by an American finance company, and so this action on the part of the oldest and most conservative banking system in the world is of particular interest to American business."

COMING EVENTS

JUNE

5-New York. National Automobile Chamber of Commerce annual meeting.
9-12—Detroit, Mich. American Society of Mechanical Engineers' semi-annual meeting.
23-26—San Francisco, Cal. Meeting American Electric Railway Association.
23-27—Atlantic City, N. J. American Society for Testing Materials annual meeting at Chalfonte-Haddon Hall.
26-28—White Sulphur Springs, W. Va. Steel Founders Society summer convention.
29-July 13—Posen, Poland. International Motor and Transport Show.

AUGUST

26-28—Chicago, Ill. Society of Automotive Engineers aeronautic meeting in conjunction with National Air Races.

SEPTEMBER

22-26—Chicago, Ill. American Society for Steel Treating meeting at Stevens Hotel.
29-Oct. 4—Pittsburgh, Pa. National Safety Council Annual Safety Congress.

OCTOBER

2-12—Paris, France. Automobile Salon.
6-11—Washington, D. C. Sixth International Road Congress.
6-11—Washington, D. C. American Road-builders' Association Convention.
8-9—Detroit, Mich. Society of Automotive Engineers production meeting at Book-Cadillac Hotel.
22-24—Pittsburgh, Pa. Society of Automotive Engineers' transportation meeting.
16-25—London, England. Olympia Motor Show.

NOVEMBER

8-16—Berlin, Germany. International Automobile Show.
8-15—Chicago, Ill. Automobile Salon at Drake Hotel.
10-14—Cleveland, O. Motor and Equipment Association Show.
17-22—Cleveland, O. National Standard Parts Association Show.
30-Dec. 6—New York. Automobile Salon at Hotel Commodore.

DECEMBER

6-17—Brussels, Belgium. Automobile Exhibition.

JANUARY

3-10—New York. National Automobile Show.
24-31—Chicago, Ill. National Automobile Show.

Power, Speed Problems in Designing Trucks, Buses

"Some Power and Speed Problems in Motor Coach and Motor Truck Design" was the title of the paper presented by A. J. Scaife, White Motor Company, Tuesday, to the summer meeting of the S. A. E. at French Lick Springs, Ind. A summary follows:—

We used to dream of the time when this country would have all of the large centers of population connected by improved highways, for then our problems would be very simple. It was difficult to get a vehicle that would have enough ability and traction to get over the unimproved roads with a fair size load. We were satisfied to run ten to fifteen miles an hour on solid tires and were of the opinion that trucks could be easily standardized as to size, wheel base and performance when the highways were all improved.

Little did we realize that good roads for long distances would bring greater problems than that with which we were then confronted. This was true not only with reference to trucks and buses, but also with reference to batteries, generators, electrical equipment, tires, etc.

This is a day of specialization in all lines of industry and transportation. When we analyze the problems of yesterday in the light of today we get an interesting picture.

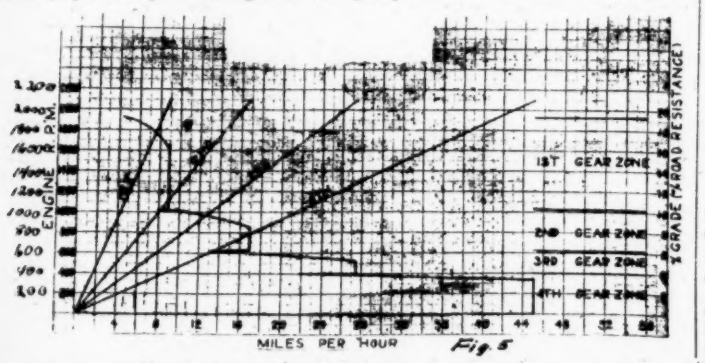

Fig. 5

Our problem is entirely different than that of the other organized units in the transportation field. The water routes have to combat wind and weather only, as their lanes of travel are perfectly level. The railroads have high speed locomotives for passenger service and heavier, slower speed locomotives for freight service. They operate over smooth ribbons of steel, encountering only slight grades of possibly less than 3 per cent. over the greater part of their lines

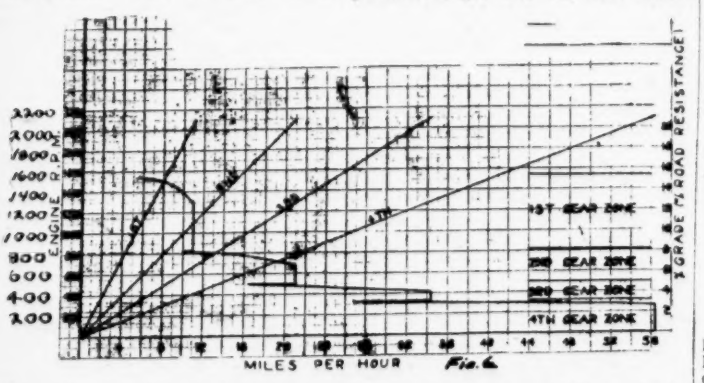

Fig. 6

Where the heavier grades are encountered they are provided with extra equipment necessary to handle the requirements—in many cases one or two extra locomotives.

With the motor vehicles this is not the case. They are expected to have the speed of an express and sufficient power to negotiate the steepest grades encountered on and off the principal highways without outside assistance.

An intense study was made of these requirements a few months ago, the object being to show graphically the operation of trucks and buses under different conditions of power and speed. Our first attempt was to show a bus operating over grades of 6 to 8 per cent. in the different transmission gears, the speed obtainable in these gears and the ability available, using the different rear axle ratios under fixed loads and tire or wheel sizes.

Chart 1 shows the first attempt at this work, and while it shows the ability zone of each gear under fixed conditions, it shows only the maximum ability in each transmission gear zone. It also shows the road speed in each gear zone possible in relation to the engine speed, but it does not show the range of ability of speed in each zone.

Chart 2 is the same as Chart 1 with the exception of the gear ratio in the rear axle. While the first chart shows a numerically low gear ratio the second chart shows a numerically high gear ratio.

Chart 3 shows the maximum ability in each gear zone and also the ability and speed at any point in the zone, so that it is possible with a bus having a fixed total gross rating with given tire or wheel size and gear ratio, to tell at a glance what the vehicle will or will not do as to speed and ability in any gear or on any grade up to the maximum ability of the vehicle.

Chart 4 is the same as Chart 3 except that the axle ratio is a higher numerical ratio than that of Chart 3.

Chart 5—This is a heavy duty, four-cylinder truck, having a gross load rating of 22,000 pounds, with a low numerical gear ratio in the rear axle. This chart shows at a glance that the rear axle ratio is not correct for the engine ability with the gross load rating. It will be noted in every case that the engine torque is under the maximum and that the engine speed is reduced below the efficient point before it is possible to get into the next lowest gear, and while it would have fairly good road speed on the level, the performance on hilly or rolling country would not be at all satisfactory.

Chart 6 illustrates a heavy duty, six-cylinder truck, with the tractor having a gross load of 70,000 pounds. This truck has a seven-speed transmission, with only the lower range illustrated. It will be noted that the transmission speeds are too far apart, making the shift from one gear to the next lowest almost impossible, so that the load has to be picked up in every gear. This not only slows down the operation, but also is very severe on the mechanical parts, especially the rear axle.

Chart 7 is the same truck as Chart 6 with a four-speed transmission, having the spacing of the gears such that the shifting is very much easier and more uniform in its power flow throguh the entire range.

Chart 8 is a light duty, higher speed truck, having a total gross rating of 10,500 pounds. The overlap of the transmission gears will be noted, which provides a very desirable setup from a standpoint of uniform load and power distribution over the entire gear range.

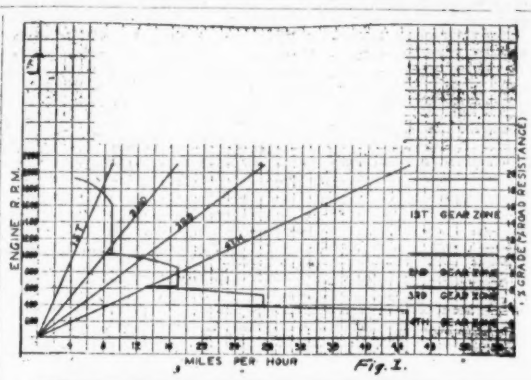

Fig. 1.

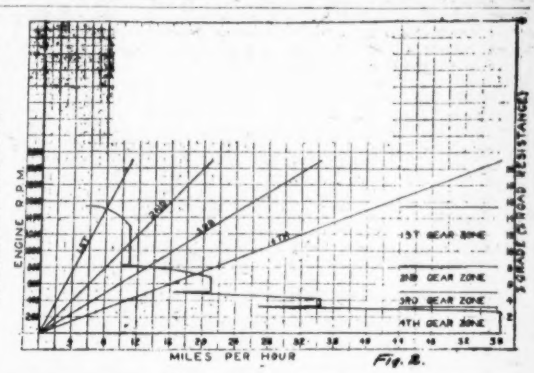

Fig. 2.

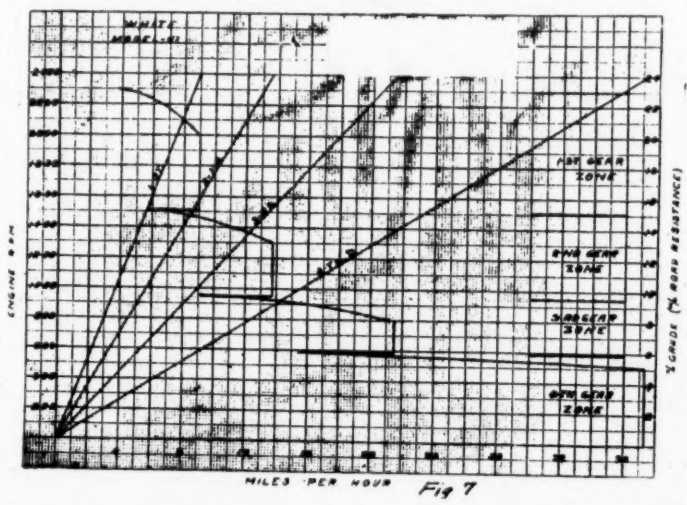

Fig 7

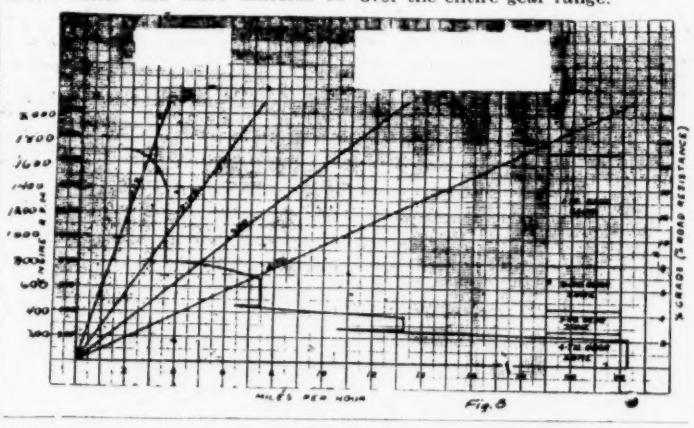

Fig. 8

Fig. 3.

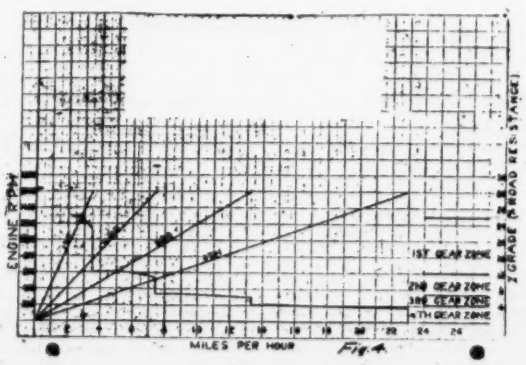

Fig. 4.

Vincent Bendix Picked To Be S. A. E. President

(Continued from Page 1)

Riker, H. G. Chatain, Col. Wall, E. T. Birdsall and P. M. Heldt, charter members of the society.

Mr. Riker, who was the first president of the society, opened this part of the program. He told how Coker Clarkson had had charge of the technical branch of the A. L. A. M. and how the secretive principles of that body had helped to bring the S. A. E. into being. Prof. Hutton, then president of the A. S. M. E., argued with Riker at that time, saying that there was no need for a new society, but Riker told him his people were too slow.

"You have been working for years," he said, "to get a standard screw thread, and you have done nothing yet. We must have quicker action than that."

All credit belonged to E. T. Birdsall, said Mr. Riker. He was the whole original works, and to him all honor was due.

Mr. Birdsall, who followed, has not lost the art of keeping his listeners in a constant state of hilarity. He told how he used to hire Henry Ford to drive his old 999 at the Empire City track and paid him $100 a day. Barney Oldfield came along and insisted on a percentage of the gate, so he got away with two or three hundred to Henry's one.

Col. Alden told how in 1894 he, with Hiram Maxim, built a gasoline tricycle which ran the first time out, though not the second time. A year later he and Riker worked at Hartford with Col. Pope. In 1901 he made the first 500-mile non-stop run, and in 1904 climbed Mt. Washington in company with Winton and Stanley, himself driving a Columbia with four cylinders.

He urged the society now to reach out a little more to leave its engineering as an entire occupation and to take part in other things with other bodies. Especially he thought it should try to help in legislation and in the solving of general problems arising out of the existence of the automobile.

Mr. Chatain told of his personal experiences last century and of the early days in France and how he built rail cars around 1900. One of these gasoline powered cars has run to date over one and one-half million miles.

Col. Wall told of the first summer meeting at Buffalo and how on that occasion he had ridden with Dave Ferguson at an actual speed of sixty miles an hour in a Pierce-Arrow. In those days, he said, speedometers were made to tell the speed and not to sell the car.

Wednesday was a day of comparative quiet, technically speaking, although one important event took place in the meeting of a sub-committee. The motor fuel research committee, which has been working for years past on many phases of motor fuel research, has a group specializing in detonation work. For nearly two years the automobile and oil industries have been calling for a standard method of rating gasolines with respect to engine knock. It was decided today to recommend to the S. A. E. standards committee that they approve the rating by Octane number.

A vast amount of co-operative work has proved that the knock tendency of gasoline can be rated with good accuracy by comparing the sample under test with mixtures of heptane and octane. By the method offered for adoption, the octane number would mean the number of parts of octane that have to be added to ten parts of heptane to make it equal to the sample.

By this method commercial gasolines would have Octane numbers from a little less than ten up to a little over twenty. This rating system is certain of approval by automobile, aviation and oil industries, and is already being used by the United States army. It will sweep away an intolerable mess of misunderstanding between buyers and sellers of fuels, and is by far the biggest thing the research committee has yet done in a long record of highly useful achievements.

The paper on vapor locking tendencies of gasoline read by Bridgeman this morning is also from the same activity. Bridgeman gave data from experiments at the Bureau of Standards that showed exactly what to do and what not to do in laying out airplane fuel lines so as to guard against the formation of gas pockets at high altitudes or in hot countries. An elaborate and careful research resulted in some very simple rules.

There is much talk of supercharges for trucks, especially buses and perhaps for passenger cars, too. The bus and big truck are in need of more power and there is great difficulty in finding space for bigger engines. Also bigger means heavier and these vehicles are too heavy already. Louis Switzer, who has done a great amount of work on this line, says he can add 40 per cent. or more to the power of any engine at a fairly low cost and others agree with him.

One great point in favor of supercharging besides the power increase is that when properly applied it does away with unequal distribution, overcomes manifold difficulties and insures equal power from each and every cylinder, thereby giving exceptionally smooth action. Bigger and better power is the supercharger slogan.

EXHIBIT OF 25-YEAR-OLD CARS AT S. A. E. MEETING

French Lick, May 29.—The parade and exhibit of twenty-five old automobiles that still run, which was scheduled for yesterday as a feature of the summer meeting of the Society of Automotive Engineers being held here, was postponed until today.

The exhibit was under the main convention hall and included some extremely interesting relics, among which was the Renault, which won the Paris to Bordeaux race in 1901.

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IN THE ACCESSORY AND SERVICE FIELD

Jersey City, N. J., May 29.—Al's Service Station, Inc.,257 Central Ave., has been chartered with capital stock authorized 1,000 shares of no par value, by the following incorporators: Leo Rosenblum, David Pesin, both of Jersey City, and Harry Klingsburg, Brooklyn, N. Y.

Marshalltown, Ia., May 29.—Contract for a new $35,000 factory plant for the Apex Regulator Company, which is owned by the Fisher Governor Company, which transferred the plant to this city from Decatur, Ill., a few months ago, has been let and the building will be ready for occupancy July 15. The plane will be 60x125 feet, brick construction with steel sash and will be newly and modernly equipped throughout.

East Rutherford, N. J., May 29.—Papers of incorporation have been filed with the county clerk by Bergen Tire Service, Inc., 10 Ames Ave., East Rutherford. The authorized capitalization is $25,000. The incorporators are Anthony Smith, Eeast Rutherford; Robert M. Mills, East Rutherford, and Florence E. Raffo, Carlstadt.

Milldale, Conn., May 29.—The Hartford Battery Sales Corporation, a new company, will continue operation of the Hartford Battery Manufacturing Company plant here, it was announced recently following appointment of Francis T. Phillips, Waterbury, as temporary receiver to wind up the affairs of the old concern. Application for receivership was made by Pearl J. Skilton and Ralph S. Munger of Waterbury; H. Merwin of Bridgeport, H. S. and J. H. Blumenthal, of West Hartford; F. W. Barhoff, Hartford, president of the concern, and the City Bank and Trust Company, Hartford, executor of the estate of James R. Goodrich, Hartford. The company manufactures automobile batteries.

Bayonne, N. J., May 29.—George Eckel has sold a service station on a plot 100x105 feet at the southwest corner of the Boulevard and West 49th Street, Bayonne, to the Shell Eastern Petroleum Products, Inc.

Rochester, N. Y., May 29.—Production capacity at the plant of the Rochester Polish Corporation, 125 North Water St., has been doubled. The concern was organized in 1926 by a group of men formerly identified with the Shinola Company, and the increase in business from year to year since that time has made the enlargement of the factory imperative.

Memphis, Tenn., May 29.—Tri-State Armature and Electric Works has extended its plant to include 105 feet on Butler Avenue, making an addition of 45 feet, for the electrical works. The place extends about 80 feet in the rear. The company serves a large part of Kentucky, Missouri, Arkansas, Louisiana, Mississippi and Alabama contiguous to Tennessee and also western Tennessee.

New Brunswick, N. J., May 29.—The L. H. Panter & Co., formerly operating as the Red Front Tire Store, 77 French St., has moved to larger and more modern quarters at 158 French St., where it has installed an electrically operated lift and battery and vulcanizing departments. The concern is wholesale and retail distributor for Hood tires in seven counties. A complete stock of accessories is carried.

Toledo, O., May 29.—Production has been started here at the new unit of the Textileather Corporation, which has moved its headquarters from Newark to Toledo. Employing 50 men now, the company expects to have 800 on the payroll when under a full production schedule. Rubber coated fabric has been added to the previous line of proxylin-coated, imitation leather fabric.

BUDD MFG. BUSY WITH STEEL GLIDER ORDERS

Philadelphia, May 29.—The Edward G. Budd Manufacturing Company of this city and Detroit reports through H. A. Coward, secretary, that it has received substantial orders for strong, inexpensive, welded steel glider ribs from Peel Gliders, Inc., of New York. The demand for speed in filling these orders is such that shipments are being made by express and motor truck.

U. S. RUBBER OFFICIAL PREDICTS ALL TRUCKS TO USE BALLOON TIRES

Wichita, Kan., May 29.—Prediction that within a short time all trucks and other commercial vehicles will roll on balloon tires, with consequent lessened wear on highways and less wear and tear on the nerves of roadside dwellers and motorists, was voiced by W. H. Buschell, technical service representative of the tire department of the United States Rubber Company. Mr. Buschell addressed a meeting of Reo distributors, dealers and field officials here.

In predicting that soon all solid and high pressure tires would be displaced by balloons, Mr. Buschell warned that, while many trucks now equipped with the old type of tire are changing over to balloons, such changeover should be made only upon the advice of tire experts. Speaking of the old type of tire, Mr. Buschell said that for local hauling of heavy loads of medium speeds, it still is desirable and satisfactory. For long distance speed hauling the balloon tire is far superior.

While here Mr. Buschell was the guest of the Hockaday Company, distributor here for United States tires.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

CUMULATIVE NEW PASSENGER CAR

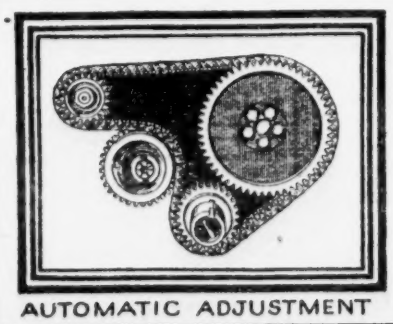
Figures in this table are from R. L. Polk & Co. of Detroit, with the exception of Illinois, which are supplied by the Robinson Advertising desiring county, city or town lists, or lists of owners in any given

Some of this data has been published previously, but it is

Returns for today: Alabama, California, Idaho, Michigan, Nevada,

States	Auburn	Austin	Black Hawk	Buick	Cadillac	Chevrolet	Chrysler	Cord	DeSoto	Dodge	Durant	Elcar	Essex	Ford	Franklin	Gardner	Graham	Hudson	Hupmobile	Jordan	La Salle	Lincoln
Alabama	1			96	3	936	54	1	19	74			32	1357			19	19	19		12	6
Arkansas	2			34	2	713	44		26	86	2		14	1197	2		21	10	2		6	1
Cal.	103		3	775	129	3549	487	46	382	598	334		359	8115	68	11	382	251	199	1	106	48
Conn.	51		2	307	59	1068	208	3	166	234	33		260	2058	17	3	126	133	112	8	71	6
Delaware	7			30	8	219	37	1	5	8	22		24	442	1			10	6		10	2
Florida	5			93	14	738	69	5	19	55	9		66	1389	9		51	43	18		12	5
Idaho	2			33		452	23	1	26	61	31		25	649	1		17	9	8		1	
Illinois	95		4	791	102	4601	499	29	374	575	111		790	9164	95	39	273	243	275	4	140	83
Maryland	18			166	9	1453	136	1	37	87	37		149	2016	11		75	72	54	2	13	2
Michigan	28			586	84	4341	284	5	198	378	112		667	10523	13		272	311	149	7	95	26
Minn.	20			256	13	3886	277	3	99	227	122		279	6429	3	4	164	131	87		42	7
Missouri	29			236	23	3282	139	7	80	231	71		313	4380	28	12	138	73	72	1	35	22
Montana	4			27		360	32	2	33	38	23		29	455	8		8	16	11		3	
Nevada	4			10		64	11		4	14	4		11	117		1		11				
N. Hamp.	15			83	11	452	63		50	44	23		88	685	10		22	19	18		10	1
N. Jersey	118			694	82	2179	422	9	163	314	85		354	4189	50	3	187	220	164	9	99	13
N. Ca'lina	1			98	3	882	103		40	102	6		73	1640	7		32	27	3		6	7
N. Dakota	1			25		732	43		31	49	26		38	1019	1	1	15	9	2		3	
Ohio	127			576	82	5194	549	17	377	604	198		760	9943	84	10	376	341	256	10	82	34
Oregon	9		1	75	5	834	60	2	58	86	118		76	1505	17	1	55	33	30	1	5	8
Pennsy	161			1099	96	5135	888	16	466	811	255		766	9905	110	10	421	403	374	16	129	40
R. Island	19			105	8	424	88	1	57	93	12		56	777	11		34	22	17		18	6
S. Ca'lina				40	1	536	37		23	39	2		19	779	1		7	17	9		3	1
S. Dakota	2			25		587	41		10	66	43		31	813	2		18	13	20		1	2
Utah	18		2	37	4	413	34	1	35	73	41		41	675	5		36	24	16		2	
Wash.	28			220	11	1104	136	4	121	124	119		100	2215	18		62	60	60	1	6	6
W. Va.	12			59	4	1126	91	2	42	142	28		138	1642	10		80	54	32	2	8	3
Wisconsin	32			293	14	2402	175	7	107	215	110		257	3756	20	9	105	125	47	1	16	11
Dis. of C.	16			110	14	470	34	3	25	28	13		61	1062	4		32	21	20	1	13	5
Totals	928		12	6979	781	48132	5064	166	3073	5456	1990		5876	88896	606	104	3028	2720	2080	64	947	345
Ala., '29	4			150	8	1721	39		23	142	23		135	1627	1		27	43	24		15	2
Ark., '29				67	8	672	46		40	108	28		58	1431			19	15	11		7	3
Cal., '29	126		10	976	155	3783	694		603	858	831	19	1423	7186	89	52	620	656	300	17	199	77
Conn., '29	84			381	78	1251	221		205	331	79		680	1971	52	4	227	185	149	11	109	20
Del., '29	10			39	5	203	13		1	13	20		71	321	2		9	15	7		12	2
Fla., '29	9		1	122	12	975	64		24	86	5		139	1407	14		52	65	42	5	13	6
Idaho, '29	3			39		349	13		17	64	78		43	645	2		17	28	8			1
Ill., '29	276		13	1148	205	5329	702		553	870	252	40	1866	7421	51	30	728	652	411	15	260	94
Md., '29	12		6	225	8	1201	123		42	150	61		333	1472	14	2	62	88	66		23	7
Mich., '29	62		2	988	86	6059	520		550	826	342	1	3294	10348	16	43	677	687	368	6	175	36
Minn., '29	48		2	259	10	2268	166		79	227	154	3	564	4855	6	5	183	167	103		37	12
Mo., '29	67		2	401	37	3896	176		166	425	250		849	4975	28	21	195	169	140	2	53	21
Mont., '29	15			101	3	784	41		46	103	73		174	991	10		48	48	19		2	1
Nev., '29	2			29	4	73	21		7	22	6		19	120	1		3	18	5		5	
N. H., '29	6		1	94	8	394	54		39	39	41		167	545	16	2	26	48	17	5	10	2
N. J., '29	143		6	671	128	2806	470		283	489	128	6	1110	3373	118	16	327	393	309	8	149	38
N. C., '29	4			162	10	1522	168		78	175	30		307	2974	5		36	105	30		12	4
N. D., '29	6			84		1159	66		50	123	65		142	1920			45	30	11			1
Ohio, 29	205		9	1057	142	6473	576		591	935	381	10	3214	9735	106	23	718	705	407	64	151	55
Ore., '29	1			94	8	636	57		29	86	161		152	1159	11	1	31	38	23		9	3
Penn., '29	209		12	1303	131	6379	1067		655	1201	473	12	2866	8768	144	24	659	784	550	53	223	56
R. I., '29	19			121	17	535	107		85	124	17	4	200	654	15	3	77	45	37	2	40	6
S. C., '29				78	2	837	60		43	54	11		106	1411	5		12	51	17		6	
S. D., '29	4			74	1	797	43		22	94	61		110	864			44	25	25		1	
Utah, '29			1	49	7	426	25		22	55	103		95	599	7	2	40	34	19		7	1
Wash., '29	22			230	9	968	144		105	204	235		341	1882	8		85	120	54		15	7
W. Va., '29	11		3	118	9	1286	125		102	230	62	4	353	1654	2		110	67	32	5	19	6
Wis., '29	32		2	448	10	3081	168		165	339	157	5	990	4143	17	6	179	250	50	7	25	3
D. of C., '29	19			96	25	435	64		17	44	14		161	795	12		61	44	43	1	26	12
Totals, '29	1399	*	70	9604	1126	56298	6063	*	4642	8417	4141	104	19962	85246	752	234	5317	5575	3277	201	1603	476

*Not in production at that time.


AUTOMATIC ADJUSTMENT

THE CHAIN YOU CAN

THERE is a deep measure of satisfaction in the use of Link-Belt Automotive Silent Chain, because it is a chain you can always depend upon for quiet action and long life. A quarter century of service has proved its correct design and uniform accuracy. This dependability is evidenced by the fact that the builders of 51 auto models, 46 trucks, 11 buses, 40 auto motors and 15 marine motors,

LINK-BELT COMPANY

In the Bus Field

Jersey City, N. J., May 29.—The Joseph J. Lefanto Bus Company, Inc., 1 Exchange Place, this city, with capital stock authorized, 100 shares of no par value, $1,000 preferred, has been formed by John Arnote, Antoinette Lefanto and Joseph Lefanto, all of Jersey City.

Sioux City, Ia., May 29.—The Interstate Transit Company, bus operating subsidiary of the North Western and Union Pacific Railroads, has taken option on the Yellow Cab Transportation Company, operating the Sioux City-Storm Lake-Spencer bus route.

Columbia, S. C., May 29. — The South Carolina Railroad Commission acted favorably on the petition of the Stokes Bus Line to extend the line so as to include Norway, the route of the line, in part, now being Neeses, Norway and Springfield. The extension adds some fifteen miles to the line, and the order became effective May 25.

Keansburg, N. J., May 29.—The Borough Council has granted a permit to the Jersey City, Newark and Keansburg Bus Company to operate a line between here and those cities. Six buses will be put in operation.

Syracuse, N. Y., May 29.—The Ackerman Motor Car Company, Franklin distributor, has moved its used car department from 704 to 944 West Genesee St., where improved facilities for rebuilding and displaying have been made available, according to S. Earle Ackerman, president.

Lincoln, Neb., May 29.—A change in the bus schedule between Lincoln and Union, Neb., has been made by the Missouri Pacific Transportation Company. The early morning bus from Lincoln now arrives at Union in time for passengers to make connections with a crack Missouri Pacific train from Omaha to Kansas City.

REGISTRATION STATISTICS, APRIL, 1930

Service, Springfield, Ill., and New Jersey, which are furnished by the New Jersey Motor List Co., New Car Division, Trenton, N. J. Readers section, may obtain these by addressing any of these three companies given here complete for the convenience of our subscribers

New Jersey, Oregon, Pennsylvania, South Dakota, Washington

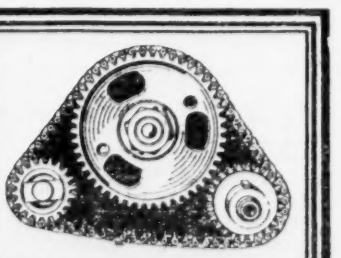
States	Marmon	Marquette	Nash	Oakland	Oldsmobile	Packard	Peerless	Pierce-Arrow	Plymouth	Pontiac	Reo	Studebaker	Stutz	Viking	Whippet	Willys	Willys-Knight	Windsor	Miscellaneous	Totals
Alabama	9	18	8	6	8	18		1	46	38	1	50		1	19	5	2			2,878
Arkansas		7	17	5	12			4	43	22	4	14			9	6	5			2,310
Cal.	67	108	331	184	282	169	25	74	205	488	112	574	6	27	51	140	129	3	18	18,939
Conn.	32	70	152	87	140	130	10	31	70	218	67	165	2	7	45	65	31	1	1	6,249
Delaware	2	6	9	19	17	12		1	14	45		11			7	9	3			937
Florida	41	16	26	19	24	22		4	37	50	13	21			15	22	5			2,915
Idaho	1	10	8	8	15	2			13	34	2	26		2	14	13				1,487
Illinois	105	90	448	191	574	209	69	37	412	860	102	444	10	37	137	270	90	27	16	22,415
Maryland	21	34	81	39	79	34	5	11	59	175	12	76		3	40	49	19		1	5,076
Michigan	63	71	176	153	563	144	14	16	337	608	89	242		37	116	191	48		7	20,954
Minn.	43	44	169	114	251	87	4	18	407	556	32	229		17	163	276	37		5	14,501
Missouri	30	38	143	76	202	58	23	27	160	332	19	94	1	6	173	172	44	12	2	10,784
Montana	12	7	36	13	14	1			42	33	7	30		1	23	27	7			1,302
Nevada		2	1		2	3			5	3	1	6			3	4			1	282
N. Hamp.	10	5	70	21	42	14	2	4	31	52	25	36		2	13	36	14			1,971
N. Jersey	68	72	371	144	341	216	49	72	119	315	50	290	2	27	30	133	119	2	10	11,784
N. Ca'lina	11	18	22	11	31	9			83	84	3	21		2	20	21	4			3,370
N. Dakota	18	7	46	16	40				66	79	2	44	1		67	52	12		1	2,446
Ohio	116	138	344	259	751	229	104	50	570	1081	85	439	4	25	270	483	178	6	28	24,780
Oregon	20	43	40	37	61	18		4	58	85	17	71		2	15	24	2s			3,502
Pennsy	151	163	546	296	640	339	72	105	596	885	122	546	1	27	148	474	154	18	14	26,398
R. Island	2	15	43	16	39	18	10	14	52	76	38	33			11	36	23		1	2,175
S. Ca'lina	8	10	10	10	15	9			26	42	2	18		1	5	6	1			1,677
S. Dakota	4	6	24	11	89	9			67	48	4	32		1	30	43	7		1	2,050
Utah	7	8	26	6	29	8		2	11	33	3	20		1	5	6	4			1,626
Wash.	13	33	68	32	120	20	9	4	95	94	18	110	1	7	36	66	38			5,159
W. Va.	29	25	65	39	77	19	1	4	73	138	35	48	1	1	76	83	21			4,210
Wisconsin	21	64	262	126	229	32	7	14	179	380	27	210		9	94	162	37		16	9,571
Dis. of C.	7	12	36	17	66	37	24	7	26	85	6	32		2	5	7	10		8	2,319
Totals	911	1140	3578	1955	4753	1866	428	504	3902	6939	898	3932	29	245	1640	2883	1070	69	130	214,118
Ala., '29	10		41	20	22	28			70	143	7	33	1		236		8		12	4,615
Ark., '29	8		42	9	19	6			80	89	5	14			135		6		1	2,927
Cal., '29	219		868	273	651	381	39	66	362	1034	160	961	15	5	562		545	28	382	25,223
Conn., '29	86		391	105	209	219	28	38	149	539	121	282	3	1	331		111	3	27	8,681
Del., '29	1		48	9	11	16	6	3	19	69	2	14			25		5			971
Fla., '29	3		64	20	45	28	2	3	66	122	9	32	1		105		19		4	3,564
Idaho, '29			25	11	14	3		1	32	48	1	28	1		61		10		4	1,546
Ill., '29	211		1396	406	842	521	76	50	581	1850	144	879	25	2	1398		253	20	195	29,765
Md., '29	30		156	52	104	38	15	14	125	245	19	72	4	4	239		49	1	7	5,069
Mich., '29	266		531	246	1179	302	36	27	730	1959	163	497	3	24	1688		241	2	101	33,081
Minn., '29	57		321	134	292	95	10	12	359	809	49	246	2	2	860		124	4	22	12,546
Mo., '29	75		377	94	453	92	33	60	287	737	40	210	12		1352		137	16	61	15,909
Mont., '29	28		117	22	78	9			120	155	16	69			193		30		18	3,344
Nev., '29	2		15	1	8	3	1		3	10	1	7			9		4			399
N. H., '29	17		102	24	42	19	1	2	44	87	11	45	1		113		26		7	2,055
N. J., '29	114		859	180	494	437	66	108	240	707	89	486	6	1	636		269	3	65	15,731
N. C., '29	6		56	51	86	27		1	140	273	10	64	1		286		25		1	6,649
N. D., '29	19		142	42	106	9		1	128	244	6	67			365		69		17	4,917
Ohio, 29	356		1058	354	1526	451	253	42	778	2213	170	829	39	6	2670		592	8	448	37,350
Ore., '29	23		70	26	71	20		3	77	148	20	74			101		41		6	3,179
Penn., '29	303		1326	388	1184	693	169	128	861	1628	185	843	27	2	2042		547	20	235	36,150
R. I., '29	19		126	24	68	40	22	20	59	179	73	94	1		123		43		12	3,011
S. C., '29	5		34	18	48	11			61	123	9	18		1	90		2			3,113
S. D., '29	4		52	17	120	5			88	119	6	68			233		28		11	2,916
Utah, '29	7		44	8	32	17			32	57	8	27	1	1	62		27			1,815
Wash., '29	27		176	52	192	42	6	2	180	218	27	179	4		183		90		7	5,814
W. Va., '29	44		123	47	124	42	9	3	154	214	32	93	4		341		49		6	5,483
Wis., '29	50		580	138	389	52	19	14	298	780	32	267	6		884		138		56	13,780
D. of C., '29	31		90	18	80	47	25	10	7	162	13	44	3	3	41		17		8	2,468
Totals, '29	2021	*	9230	2789	8489	3653	816	608	6130	14961	1428	6542	160	52	15364	*	3505	103	1713	292,071

LWAYS DEPEND UPON

including leaders in both America and Europe, have adopted Link-Belt Automotive Silent Chain as standard factory equipment. There is also a sense of security in the knowledge that Link-Belt's extensive manufacturing resources, and its reputation for quality products, guarantee the thoroughly dependable service rendered by every Link-Belt Automotive Silent Chain.

INDIANAPOLIS - - DETROIT

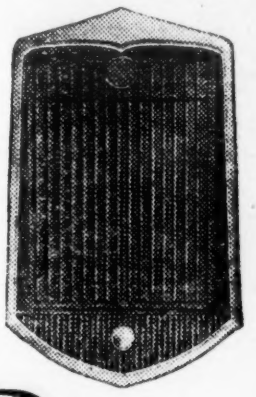
3955-A



MANUAL ADJUSTMENT

Trademark)

EASIER TO SELL THAN EVER BEFORE



Pines AUTOMATIC winterfronts

are firmly established as the best protection for ALL cars

REGARDLESS of the fact that a great many automobile manufacturers now offer Pines Automatic Winterfronts as standard equipment on their cars, dealers still have millions of prospects—cars that are being driven without this automatic radiator protection. The judgment of the leading automotive engineers in adopting this device has made owners of *all* cars conscious of the fact that automatic radiator protection is indispensable in the efficient operation of a motor vehicle. Pines Automatic Winterfronts are easier to sell today than ever before. Let your nearest Pines distributor explain the profit possibilities in selling and servicing Pines Automatic Winterfronts—or write direct to the factory.

There's only one Winterfront. It's made by Pines. Identified by name plate below.

Be sure you get the
GENUINE
Pines Automatic Winterfront

PINES WINTERFRONT COMPANY
1135 N. Cicero Ave., Chicago

Wholesale distributing connections everywhere. Write for name of your nearest distributor

FIFTY KARI-KEEN DISTRIBUTORS MEET

Indianapolis, Ind., May 29.—F. E. Moskovics, former president of the Stutz Motor Car Company and now connected with a New York banking house, was in Indianapolis with C. H. Myers, president of the Kari-Keen Luggage Manufacturing Company of Sioux City, Ia., to attend a district meeting of about fifty Kari-Keen distributors in this section of the state. The session was held in connection with the introduction of a new line of Kari-Keen motor baggage equipment.

WISCONSIN AXLES

have a notable record for sturdy efficiency, for lack of troubles, in every type of commercial service.

WISCONSIN AXLE CO.
Oshkosh Wisconsin

LINCOLN ELECTRIC CO. PROMOTES H. F. KNEEN

Cleveland, O., May 29. — Announcement has been made of the advancement of Harold F. Kneen to plant superintendent of the Lincoln Electric Company of this city, manufacturer of "Linc-Weld" motors and "Stable-Arc" welders.

Kneen came to the Lincoln Electric Company as assistant plant superintendent in June, 1929. Previous to that time he had held positions with the Indiana Flooring Company as superintendent of their Ironton, O., plant and as heat transfer engineer for the Ingersoll Rand Company.

Concurrent with the announcement for Mr. Kneen's appointment comes announcement of the appointment of C. J. Bowers as production manager of the Lincoln Electric Company's plant here.

NEW FIRM CHARTERED

Buffalo, N. Y., May 29.—With a capital of $25,000 the LeBeau Auto Accessories Corporation has been organized and incorporated to establish and operate a wholesale and retail automotive accessory and unit parts business here. Principals of the new firm are Henry White, Sr., and Henry White, Jr., of Buffalo, and Ethan W. Judd, of East Aurora, N. Y.

NEWARK FISK DEALERS HEAR TALK BY LLOYD

Newark, N. J., May 29.—Officials of the Fisk Tire Company, Inc., entertained forty dealers from the Newark district at dinner. W. H. Lloyd, local distrct sales manager, who represented the company, after dinner explained the plans for the year. A four-reel picture showing the construction of Fisk Air Flight Principle Tires from the gathering of the raw material to the shipment of the finished product was shown. This was followed by general discussion.

GULF TO MOVE ACTIVITIES

Bayonne, N. J., May 29. — The warehouse and barreling plant destroyed by fire at the Bayonne plant of the Gulf Refining Company on May 8, when damage to the extent of $3,000,000 was caused, will not be rebuilt, but room will be made for both structures in the Gulf Refining Company's $20,000,000 oil storage development in Staten Island.

165 EXIDE DEALERS HEAR SOMERVILLE AT NEWARK

Newark, N. J., May 29.—An Exide dealers' meeting was held in the St. Regis Restaurant here, with Nick Iacovanti, president of the Electric Battery Company, 47 William St., Exide distributor for New Jersey, as chairman of the meeting. He introduced to the 165 Exide dealers and representatives R. L. Somerville, sales manager of the Electric Storage Battery Company's New York branch, and Richard Pettit of the same office.

FISK DEALERS MEET

Jersey City, N. J., May 29.—Fisk tire dealers of Essex and Hudson counties were the guests of the Fisk Tire Company at a dinner in this city. District Manager W. H. Lloyd was in charge and outlined the advertising and sales plan of the company for this year. About fifty-two dealers attended.

SUPPLY FIRM FORMED

Camden, N. J., May 29.—The Checker Auto Supply Company, Inc., has been formed here and capitalized at 1,000 shares no par. W. Franci Barnett, Jr., Wilbur Phillips, Jack I. Goldstein, Camden, are the directors.

Cumulative New Commercial Car Registration Statistics, April, 1930

Alabama, California, Connecticut, Maryland, Michigan, Nevada, New Hampshire, New Jersey, Oregon and Pennsylvania.

Some of this data has been published previously, but it is given here complete for the convenience of our subscribers.

Figures in this table are from R. L. Polk & Co. of Detroit, with the exception of Illinois, which are supplied by the Robinson Advertising Service, Springfield, Ill., and New Jersey, which are furnished by the New Jersey Motor List Co., New Car Division, Trenton, N. J. Readers desiring county, city or town lists, or lists of owners in any given section, may obtain these by addressing any of these three companies.

Commercial Car Registrations do not include buses.

States	Autocar	Brockway-Indiana	Chevrolet	Diamond-T	Dodge	Dover	Fargo	Federal	Ford	G. M. C.	International	Mack	Paige	Relay	Reo	Republic	Rugby	Sterling	Stewart	Studebaker	Whippet	White	Willys	Willys-Knight	Miscellaneous	Totals	States
Alabama			280		10		1	2	197	6	17	3	1		3	2				1	1	3	3			530	Alabama
Arkansas			156		6			1	214	9	30	2			4							7	1		1	431	Arkansas
California			634	1	130	2	3	14	1511	78	80	35	1		123	5	10	23	8	17	5	31	4	2	155	2872	Calif.
Conn.	8	12	173	8	59	2	6	5	325	28	41	35	6		36		1	3	15	2	5	6	4	2	18	800	Conn.
Delaware	5	4	46		1		1		64	6	9				6	1						1			1	145	Delaware
Florida		2	122		9				230	7	10	1			4						1	6				392	Florida
Idaho			67		9				123	7	17				4						1		1	1		230	Idaho
Illinois	8	20	663	54	72	2	9	19	932	41	111	17	3	2	26	1	2	5	7		14	12	13	1	79	2113	Illinois
Maryland	19	12	218	8	29	1	3	2	312	25	62	22	1	1	24	2	1	1	3	1	2	25	2	1	13	790	Maryland
Michigan	3	2	502	10	35	5	6	20	1119	59	97	2	10		38	7	4			1	9	12	8		19	1968	Michigan
Minnesota		9	560	11	60	1	3	4	765	28	129	9			32					4	10	12	16	3	3	1659	Minn.
Missouri		13	653	15	50	1	5	11	803	35	97	6	3	1	11		2	3	4	9	5	4	14	7	21	1773	Missouri
Montana			66		3		4		95	5	29	2			3						1	5	4	1	3	221	Montana
Nevada			11		2				23		1										1			1	2	41	Nevada
N. Hamp.		9	114	6	7				188	8	12	8			18			1	5	2		1	1		1	381	N. Hamp.
New Jersey	19	18	348	17	97	8	6	10	788	59	41	38	9	2	31	1	2	9	5	7	7	18		2	42	1584	New Jer.
N. Carolina			277		21				251	13	26	4			4	1	1				2	2	5		5	612	Nor. Car.
N. Dakota			112	1	9		1		144	2	77	1	1		11		1						11	2		373	N. Dak.
Ohio	16	30	651	7	96	6	9	13	1214	31	159	21	5	5	48		4	11	22	9	36	48	36	11	73	2611	Ohio
Oregon	2		121		10		1	9	310	14	16	5			5	1	3	4			2	7			15	525	Oregon
Penn'vania	54	59	721	16	138	7	15	28	1455	100	190	84	9	16	60	3	5	15	68	6	18	49	25	5	55	3201	Penna.
Rh. Island	1	2	60		15		1	10	126	18	10	6	1		3			1	1	3		1			2	261	R. Island
S. Carolina			166		3		1	4	139	3	5	1			1							5	1		1	330	S. Car.
S. Dakota			79	1	9		2		90	2	44	2			12	1	1				3		6		1	253	S. Dakota
Utah			80		11	2			144	2	22	2			3					1					4	271	Utah
Wash'ton	1		152		18		3	6	411	29	25	2	1		3		3	4		2		18	1	1	44	723	Wash'ton
W. Virginia		3	205	4	34	1			245	17	44	1	1	1	15	1			2		2		3	1	6	586	West Va.
Wisconsin		3	568	29	36	1	3	7	807	32	124	2	2	6	31		2	15	7	2	9	6	9	1	21	1723	Wisconsin
Dist. of Col.	5		17	2	3			1	85	13	1	1									1	6			1	136	D. of Col.
Totals	141	198	7822	190	982	39	83	166	13110	727	1526	312	53	34	559	26	42	95	147	67	135	285	168	42	586	27535	**Totals**
Ala., 1929			390		28		1	3	282	14	59	1			5						3	8			4	798	Ala., 1929
Ark., 1929			240		21				356	4	87	2			6					1	4	7			9	737	Ark., 1929
Calif., 1929	15	1	536	3	227		12	18	1544	88	54	48			152	3	16	20	6	13	13	28		2	240	3039	Calif., '29
Conn., 1929	20	14	247	3	111		9	9	318	54	52	49		3	70	1	3	4	20	10	3	15		3	21	1039	Conn., '29
Del., '29	4		53		4				67	8	24				9		1				1	2			3	176	Del., 1929
Fla., 1929			158		5				182	6	17	6			8						3	4			5	394	Fla., 1929
Idaho, '29			71	8					51	3	9	1										4			11	*158	Idaho, '29
Illinois, '29	18	5	847	86	128		11	13	1111	43	188	27		1	42	1		11	1		15	35			137	2720	Ill., 1929
Md., 1929	11	2	214	7	36		2	2	319	31	39	26		1	26	4		5	3	2	3	14			13	762	Md., 1929
Mich., 1929	3	18	892	6	110		9	23	1411	103	152	11			89	5	7			7	24	7		4	41	2922	Mich., '29
Minn., 1929			415	2	36		1	9	485	19	79	5		1	23		3			6	17	9			3	1113	Minn., '29
Mo., 1929	5	20	706	33	116		4	12	744	73	148	19		2	32	1	3	6	3	7	20	11		1	76	2042	Mo., 1929
Mont., 1929			177		37		2	3	267	17	82				29						2	2		6	1	625	Mont., '29
Nev., 1929			20		14				44		2	1						1				1			4	87	Nev., 1929
N. H., 1929		4	132		20			3	159	13	8	4			18				1	2	5	1		2		372	N. H., '29
N. J., 1929	28	37	579	15	137		21	24	711	57	44	100		2	69	2	9	14	5	6	20	38		3	99	2020	N. J., '29
N. C., 1929	6	2	471		49			1	354	20	24	11			8		3			1	7	6			18	981	N. C., '29
N. D., 1929			185		19				243	14	164				6		3				7	4		3		648	N. D., '29
Ohio	18	26	869	13	175		9	15	1214	71	197	30		9	90	3	4	2	10	5	53	58		3	60	2934	Ohio, '29
Oregon, '29			144	1	33		2	4	224	16	18	5			11		1				1	9			7	476	Ore., 1929
Penna., '29	61	45	1021	19	271		34	20	1484	107	197	110		22	136	8	9	33	46	15	49	66		7	101	3861	Pa., 1929
Rh. Isl., '29	10	1	82		29		3	4	96	15	13	7			35		1		6			5		1	5	313	R. I., 1929
S. C., 1929			253		11		2	2	186	14	18				2				1						2	491	S. C., '29
S. Dak., '29			88	1	11				69	6	59	1			15						2			2		254	S. D., 1929
Utah			61		17		1		100	3	9	2					1			1		6			3	204	Utah, '29
Wash., 1929			184		42		4	4	391	33	24	3			23	1	2			1	2	21			36	771	Wash., '29
W. Va., 1929		8	247	3	28		3	1	226	20	54			2	17				2		1	3			3	618	W. Va., '29
Wis., 1929			738	25	62		3	14	897	39	136	5		4	45	1	3	15	9	5	9	15			31	2056	Wis., 1929
D. C., '29	2	4	45	12	11				84	7	2	10		2	7				4			4			2	196	D. C., '29
Totals	201	187	10065	237	1790	*	133	184	13619	898	1959	484	*	49	973	30	69	111	147	82	264	383	*	37	935	32807	**Totals**

*Not in production at that time.

Measuring Engine Acceleration Described by Bruce

C. S. Bruce of the Bureau of Standards delivered a paper on "Engine Acceleration" at the research session, Thursday, of the summer meeting of the S. A. E. at French Lick Springs, Ind. The paper is summarized below.

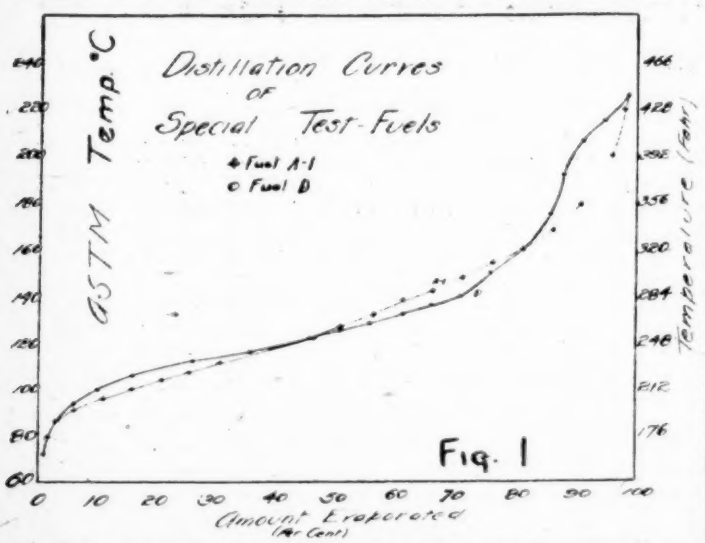
The measurement of engine acceleration was undertaken by the Bureau of Standards in connection with an investigation of the economic volatility of motor fuels, initiated about May 1, 1920, by the committee of this society on the utilization of present fuels in present engines. Later the work was continued under the direction of the steering committee of the Co-operative Fuel Research. That part of the investigation relating to engine acceleration has now been concluded. This paper constitutes a final progress report, and presents a summary of the results.

The method first used for measuring acceleration, described to the society in papers[1] by Messrs. James, Dickinson and Sparrow, consisted essentially of letting the engine idle at low speed with light load, then suddenly opening the throttle fully and noting the successive readings of a chronometric tachometer until a speed of 1,800 r. p. m. was reached.

Elapsed time and engine revolutions were recorded on a chronograph. Results were expressed as speed-time curves, and it was concluded that "within the limits of this work the greater the amount of heat supplied to the charge and the higher its temperature at the intake port, the more rapidly the engine will accelerate."

With the organization of the Co-operative Fuel Research in the summer of 1922, came further work on fuel volatility. The work was done on the road, using two makes of car, and was reported to this society in papers by R. E. Carlson[2] and Roger Birdsell[3]. A graphic record of car-speed changes during runs was obtained by connecting a pen movement to a Van Sicklen chronometric tachometer. The conclusion reached was that the effect of differences in volatility of the fuels on acceleration was not measurable by roadtest. Laboratory tests, however, did show decided differences in acceleration results between fuels which differed in volatility but had nearly the same initial point. As an appendix to Mr. Birdsell's paper, a mathematical discussion[4] was given by W. S. James of the design of the inertia disc used in laboratory tests to simulate the inertia of the car.

On December 4, 1925, the steering committee of the Co-operative Fuel Research Committee recommended that "the study of engine starting, which had thus far dealt with the obtaining of the initial start, ultimately should cover the behavior of the engine during the warming-up period, particularly as regards acceleration."



A preliminary study of engine acceleration was made using a chronometric tachometer, and reported by J. O. Eisinger[5]. This work showed decided differences in initial lag under different conditions and, to a lesser degree, differences in acceleration can be inferred from the speed-time curves. In the course of this work it was desired to determine the acceleration obtained with each of three fuels having widely different A. S. T. M. 50 per cent. points. The results obtained and reported by Bost and Eisinger were not sufficiently accurate to lead to definite conclusions.

Because of the insufficient accuracy of the chronometric tachometer method of measuring acceleration, a study of other possible methods was made. In June, 1928, D. B. Brooks[6] reported: "An adaptation of the displacement time method, which has been adopted for use in this investigation, consists in driving a paper tape at a speed proportional to the engine speed and discharging a spark through the tape at equal time intervals. A displacement time record is thus obtained, the second derivative of which gives the acceleration. One reason for selecting this particular method is that the absolute measurements involved can be made with sufficient precision to permit of double differentiation and still yield results of the desired accuracy. Further increase in accuracy can be obtained by increasing the ratio of tape speed to engine speed."

The apparatus constructed on this basis, and known as the spark accelerometer, was used in a study of the effect of operating factors and of fuel volatility on acceleration performance. In the course of this study a relation was found between the distillation curves of fuels and their effectiveness for producing acceleration. The results indicated that if this relation were equally applicable to engines other than the one used in making the tests, it would be possible at least to estimate the relative acceleration performance with different fuels from their distillation data.

FIELD TESTS

The steering committee recommended that these tests be extended to include engines differing in design.

A portable model of the spark accelerometer, described[7] and exhibited at the 1929 summer meeting, was used in making these tests at the laboratories of four automobile companies. Further tests were then made with this apparatus at the Bureau of Standards.

The results of these field tests reported[8] at the 1930 winter meeting showed a fair agreement with the relation previously found.

FINAL FUEL VOLATILITY TESTS

At this time a fuel became available having a volatility such that, used in comparison with a fuel prepared especially for acceleration work, it offered an opportunity for a very delicate test of the relation previously found. Distillation curves of these fuels are shown (Fig. 1).

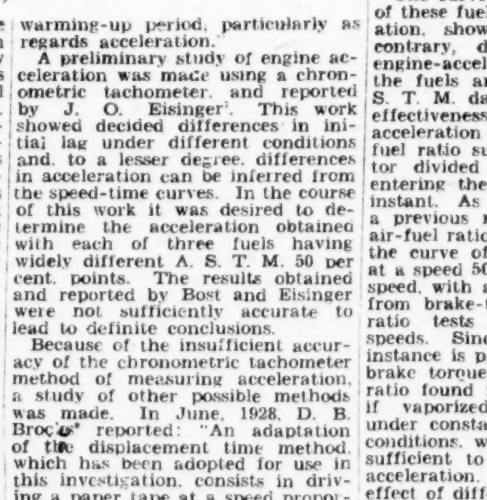
As stated in previous reports, the measure of relative fuel volatility, found to give curves similar to those derived from acceleration tests, is obtained as follows: One fuel is selected as the reference. Its volatility is taken as a unit at all temperatures. At 5 per cent. evaporated, the A. S. T. M. temperature, in degrees absolute, for the reference fuel is divided by that for one of the other fuels—in this case Fuel D. The value so obtained is called the relative volatility of Fuel D with respect to the reference fuel—A-1. This procedure is then repeated at successively higher percentages evaporated. By plotting the values so obtained at each percentage evaporated against the A. S. T. M. temperature of the reference fuel at the same per cent. evaporated, the curve of relative volatility shown in Fig. 3 is obtained. It is emphasized that this curve was derived solely from the A. S. T. M. distillation data for the two fuels.

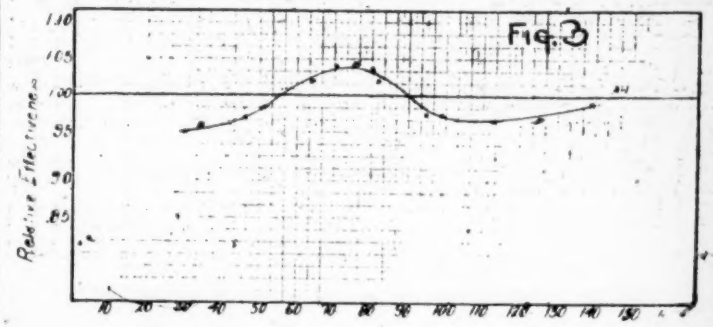
The curve of relative effectiveness of these fuels for producing acceleration, shown, Fig. 3, is, on the contrary, derived solely from engine-acceleration test data for the fuels and does not involve A. S. T. M. data in any way. The effectiveness of a fuel for producing acceleration is defined as the air-fuel ratio supplied by the carburetor divided by the air-fuel ratio entering the cylinders at the same instant. As described more fully in a previous report 10, the effective air-fuel ratio is found by comparing the curve of observed acceleration, at a speed 50 r.p.m above the initial speed, with a contour chart derived from brake-torque versus mixture-ratio tests at various constant speeds. Since acceleration at any instance is proportional to available brake torque, the effective air-fuel ratio found is that mixture which, if vaporized and distributed as under constant-speed operating conditions, would give brake torque sufficient to produce the observed acceleration. To minimize the effect of differences in supplied air-fuel ratio, speed, and so forth, results are expressed as effectiveness of the fuel relative to one fuel chosen as a reference, in the same manner as the relative volatilities.

While the relative effectiveness of the fuels is given for the sake of clearness of discussion, in terms of air-fuel ratios, it should be understood that these ratios are not capable of being measured directly, and may not even be equal to those delivered. The ratios are deduced indirectly from the observed accelerations, and may be considered effective ratios, which, on the hypotheses used, would produce the accelerations observed.

From Figs. 1 and 2, it can be seen that the difference in volatility between the fuels is very small. Furthermore, the distillation curves intersect four times. If the relation previously found holds good, it would be necessary that the curves of relative effectiveness for acceleration intersect four times, provided that the manifold temperature were varied over a sufficient range. In these tests, high manifold temperatures were made possible by use of ethylene glycol in the manifold jacket.

Due to the small difefrence in volatility between the fuels, more than usual care was taken in maintaining constant test conditions in order that accidental errors might not obscure any real differences in acceleration performance. The results shown in Fig. 3 are believed to represent the most precise set of acceleration tests yet made.





From the intersections of the D and A-1 curves in the two figures, the relation between manifold and corresponding A. S. T. M absouite temperature is found to be 1.20 times the manifold absolute temperature. This value of the temperature factor is in good agreement with values obtained on previous tests, these latter ranging from 1.18 to 1.22, but averaging 1.20. Use of this factor to estimate acceleration performance from A. S. T. M. distillation data is explained in a previous report 13.

COMPARATIVE PERFORMANCE OF UPDRAFT AND DOWNDRAFT INDUCTION SYSTEMS

Coincident with the introduction of fuel pumps in automotive work has come an increased interest in downdraft carburetors and manifolds. Since acceleration performance is primarily a function of the volatility of the fuel and the behavior of the induction system, it was felt that this research should include a direct comparison of downdraft with updraft induction.

Acceleration tests were run on both down and up types of induction system, with carburetors set for each of several air-fuel ratios. Under each of these conditions, a series of tests was made, varying the accelerating charge. Parallel with these tests, runs were made using three one-inch carburetors coupled to the block by pipes about two inches long. These three carburetors were adjusted separately to have equal characteristics. The throttles were interconnected and were adjusted for equal power when operating at normal load at 300 r.

(Continued on Page 10)

[1] S. M., S. A. E., Assistant Engineer, Bureau of Standards.
[2] See The Journal, August, 1920, page 131, and January, 1921, page 3.
[3] See The Journal, February, 1923, page 139.
[4] See The Journal, March, 1924, page 267.
[5] See The Journal, March, 1924, page 271.
[6] See The Journal, August, 1927, page 184.
[7] See the Bulletin of the American Petroleum Institute, Jan. 31, 1928, page 74.
[8] See The Journal, September, 1928, p. 235.
[9] See The Journal, June, 1929, page 609.
[10] See The Journal, August, 1929, page 174.
[11] See The Journal, April, 1930, page 471.

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MEASURING ENGINE ACCELERATION TOLD

(Continued from Page 9)

p. m. Acceleration tests and power and mixture ratio versus speed measurements were made at four carburetor settings.

While this entirely dispenses with the manifold, thus affording an interesting comparison with the updraft and downdraft test series, it yet represents, in an elementary way, cold carburetion. Complete parallelism with the other two series of tests was not possible, as these carburetors did not have accelerating charge pumps.

In connection with these curves attention is called to the fact that only by means of acceleration curves can the correct proportioning of the quantity and rate of injection o faccelerating charges be determined with precision. Measurement of total time required for a given increase of speed will not indicate whether too much or too little charge has been used; speed-time curves are somewhat more instructive, but do not give quantitative information. From the curves here presented, by noting the amount that the observed acceleration falls short of the computed maximum shortly after the start of the acceleration, an estimate of the correct charge may be made readily.

However, to compare the acceleration performance of different types of induction systems, it is necessary to eliminate effects due to carburetor characteristics, since it is not possible to use the same carburetor in the two cases, and is not feasible to make the characteristics of the updraft and downdraft carburetors identical. A suitable method of analysis, fully described in a previous report 14, consists essentially in conversion of the observed acceleration into units of torque, and, from the latter with the aid of mixture ratio — torque curves obtained from constant speed runs, estimation of the "effective" air-fuel ratio required to produce the observed acceleration. From a comparison of the values of effective air-fuel ratio so obtained with the known carburetor metering characteristics, a time plot is made of the ratio of fuel leaving the manifold to fuel supplied by the carburetor. This type of chart, is practically a "manifold of efficiency" chart.

Since the settings on up and downdraft carburetors could not be made to give identical mixture ratios, it was necessary to derive from the manifold efficiency charts a set of values which, when plotted against mixture ratios, would be a measure of manifold performance.

The test in which the mean air-fuel ratio was 11.9, shows reasonably rapid increase of acceleration to the computed maximum; at 300 r.p.m. the supplied air-fuel ratio was about 13. With so lean a mixture, no acceleration would be obtained with the ordinary manifold system.

The fact that computed maximum acceleration is not at once realized, however, indicates that time and fuel are required to wet even the short induction system here used. In the more exact analysis, Fig. 11, this fact is clearly shown. The leanest test run requires somewhat more than twice as long to reach the standard performance value of 0.9 than does the richest, indicating that roughly the same amount of fuel is required in either case.

Lastly, just as maximum acceleration is more rapidly attained with this simplified induction system, so is the effect of too rich a mixture shown at an earlier point on the acceleration curve. Thus the 8.2 to 10.1 air-fuel ratio runs, show the effect of over richness after about 550 r.p.m.

It has been found necessary to maintain the initial speeds very nearly equal on successive runs in order to obtain acceleration curves suitable for this analysis.

Resume

In the course of these investigations of engine acceleration the following results have been obtained:

1. Road acceleration tests have been demonstrated to yield information neither sufficiently precise nor sufficiently detailed to permit determining definitely the causes of readily detectable differences in acceleration performance.

2. A portable spark accelerometer has been developed, with which engine acceleration can be measured as precisely as variations in other engine factors warrant. This instrument is simple in operation and moderate in cost.

3. Technique of operation and methods of analysis have been developed, enabling a maximum of results to be obtained from each test.

4. The effect of fuel volatility is

(Continued on page 11)

MAJOR SPECIFICATIONS AND MECHANICAL DETAILS

MAKE AND MODEL	Weight—5-P. Sedan	Wheel Base	Engine Make	Fan Belt Type	Thermostat Used	Valve Arrangement	Cylinders	Bore and Stroke	Piston Disp.	Compression Ratio	Tax H. P.	Brake, H. P. and Peak R. P. M.	Pist. Make or Material	No. Main Br.	Oil Purifier	Fuel Clean'r	Carburetor	Air Cleaner
Auburn 6-85	3255	120	Lyc	V	Yes	L	6	2⅞x4¾	185	*5.16	19.8	65@3400	*Alum	4	—	—	Sch	—
Auburn 8-95	3510	125	Lyc	V	Yes	L	8	2⅞x4¾	246	*5.15	26.4	93@3300	*Alum	5	Yes	AC	Sch	—
Auburn 125	3908	130	Lyc	V	Yes	L	8	3¼x4½	299	*5.25	33.8	125@3600	*Alum	5	Yes	AC	Sch	—
Blackhawk 6	4320	127½	Own	V	Bish-Bab	O	6	3⅜x4½	241.5	5.0	27.3	85@3150	*Alum	7	Wal	AC	Zen	AM
Blackhawk 8	4185	127½	Own	V	Bish-Bab	L	8	3 x4¾	268.5	5.50	28.8	88@3200	*Alum	5	Wal	AC	Zen	AM
Buick 40	3881	118	Own	V	Yes	O	6	3 1/16x4⅝	257.5	4.51	28.4	80½@2800	CI	4	AC	AC	Mar	AC
Buick 50 and 60	4443	124-132	Own	V	Yes	O	6	3¾x5	331.0	4.37	33.75	98@2800	CI	4	AC	AC	Mar	AC
Cadillac 353	5055	*210	Own V	V	Yes	L	8	3⅜x4 13/16	353	4.7	36.5	95@3000	CI	3	AC	Gas	Own	—
Cadillac 452	6100	148	Own	V	Yes	O	16	3 x4	462.0	5½	57.5	165@3400	CI	5	AC	Gas	Own	None
Chevrolet	2500	107	Own	V	Yes	O	6	3 3/16x3¾	194.0	5.01	26.3	46@2600	CI	3	—	AC	Car	AC
Chrysler 6	2745	*169¼	Own	V	Yes	L	6	3 1/16x4¼	195.6	5.2	23.44	62@3200	Alum	4	—	Yes	Car	—
Chrysler 77	3770	*177½	Own	V	Yes	L	6	3⅜x5	268.4	5.0	27.34	93@3200	*Alum	7	Yes	AC	Str	Un
Chrysler 70	3435	*168½	Own	V	Yes	L	6	3⅜x5	268.4	5.0	27.34	93@3200	*Alum	7	Yes	AC	Str	Un
Chrysler 66	2850	*163¼	Own	V	——	L	6	3 1/16x4¾	218.6	5.1	23.43	68@3000	Alum	7	—	AC	—	—
Chrysler Imperial	4335	*191	Own	V	Yes	L	6	3⅜x5	309.3	5.0	31.54	100@3200	Alum	7	Yes	AC	Str	Un
Cord (Fr. Wh. Dr.)	4530	137½	Lyc	V	——	L	8	3¼x4½	298.6	5.25	33.8	125@3600	*Alum	5	Yes	AC	Sch	—
De Soto 6	2645	*169⅛	Own	V	Yes	L	6	3 1/16x4⅛	189.81	5.16	23.44	60@3400	*Alum	4	Yes	AC	Car	Un
De Soto 8	2965	*177	Own	V	Yes	L	8	2⅞x4	207.7	5.2	26.45	70@3400	Alum	5	Yes	AC	Str	Yes
Dodge Six	2900	112	Own	V	Bish-Bab	L	6	3⅜x3 7/8	208	5.18	27.3	58@3000	*Alum	7	Yes	AC	Str	Han
Dodge Senior	3572	120	Own	V	Yes	L	6	3⅜x4½	241.5	5.5	27.3	78@3000	*Alum	7	Yes	Yes	Str	Un
Dodge Six D D	2738	*169	Own	V	Yes	L	6	3¼x4⅛	189.8	5.2	23.4	60@3400	Alum	4	No	No	Car	—
Dodge 8	3113	*177	Own	V	Yes	L	8	2⅞x4¼	220.7	5.2	26.5	75@3400	Alum	5	Yes	No	Str	—
Durant 6-14	2950	*172¼-176	Con	V	Bish-Bab	L	6	3¼x4	199	5.32	25.4	58@3100	*Alum	4	AC	AC	Str	AC
Durant 617	3290	*175¾-179½	Con	V	Bish-Bab	L	6	3⅜x4⅝	248	5.06	27.34	70@3000	*Alum	7	AC	AC	Str	AC
Elcar 6-75	2942	117	Lyc	V	Yes	L	6	2⅞x4¾	185	5.25	19.8	61@3000	*Alum	4	Yes	Gas	Sch	—
Elcar 140 and 130	——	135-130	Con	V	Yes	L	8	3⅜x4½	322	5.25	36.45	140@3300	*Alum	5	Yes	Gas	Sch	—
Elcar 8-95-96	3299	123	Lyc	V	Yes	L	8	2⅞x4¾	246.7	5.25	26.5	90@3000	*Alum	5	—	Gas	Sch	—
Essex	2805	113	Own	V	——	†L	6	2¾x4½	160.4	5.8	18.15	60@3600	Alum	3	—	Ste	Mar	AC
Ford A	2386	103½	Own	V	——	L	4	3⅞x4¼	200.5	4.22	24.03	40@2200	Alum	3	—	AC	Zen	—
Franklin 145	3930	125	Own	—	Bish-Bab	*O	6	3½x4¾	274	5.3	29.4	95@3000	Alum	7	AC	AC	Str	AC
Franklin 147	4060	132	Own	—	Bish-Bab	*O	6	3½x4¾	274	5.3	29.4	95@3000	Alum	7	AC	AC	Str	AC
Gardner 136	3330	122	Lyc	V	Yes	L	6	2⅞x4¾	185	5.05	19.8	70@3500	*Alum	4	Yes	Gas	Sch	AM
Gardner 140	3500	125	Lyc	V	Yes	L	8	2⅞x4¾	246.6	5.15	26.5	90@3300	*Alum	5	Yes	Gas	Sch	AM
Gardner 150	3890	130	Lyc	V	Yes	L	8	3¼x4½	298.6	5.25	33.8	126@3300	*Alum	5	Yes	Gas	Sch	AM
Graham Std. 6	3175	115	Own	F	Yes	L	6	3⅛x4½	207	5.41	23.44	66@3200	*Alum	7	No	AC	DL	AC
Graham Spl. 6	3390	115	Own	F	Yes	L	6	3¼x4½	224	5.49	25.35	76@3400	*Alum	7	AC	AC	DL	AC
Graham Std. 8	3795	122	Own	V	Yes	L	8	3¼x4½	298	5.20	33.80	100@3400	*Alum	5	AC	AC	DL	AC
Graham Spl. 8	3875	122	Own	V	Yes	L	8	3¼x4½	298	5.20	33.80	100@3400	*Alum	5	AC	AC	DL	AC
Graham Cust. 8	4300	127	Own	F	Bish-Bab	L	8	3⅜x4½	322	5.41	36.45	120@3200	*Alum	5	AC	AC	John	AC
Graham Cust. 8	4405	137	Own	F	Bish-Bab	L	8	3⅜x4½	322	5.41	36.45	120@3200	*Alum	5	AC	AC	John	AC
Hudson Super 8	3200	119-126	Own	V	——	*L	8	2¾x4½	213.8	5.8	24.2	80@3600	Alum	5	—	Ste	Str	Yes
Hupmobile S	3640	——	Own	V	Yes	L	6	3¼x4¼	211.5	4.8	25.3	70@3200	CI	4	Yes	Ste	Str	Yes
Hupmobile C	3725	——	Own	V	No	L	8	3 x4¾	268.6	5.05	28.8	100@3200	CI	5	Han	Gas	Str	Yes
Hupmobile H	4000	——	Own	—	No	L	8	3½x4¾	365.6	5.2	39.2	133@3400	Alum	5	Yes	Ste	Str	Yes
Jordan St. Line 80	3590	120	Con	V	Bish-Bab	L	8	2⅞x4¾	246.7	5.1	26.5	80@3000	*Alum	5	Ste	AC	Str	AC
Jord'n G. Ninety 8	3600	125	Con	V	Pines	L	8	3 x4¾	268.6	5.1	28.9	85@3200	*Alum	5	Ste	Ste	Str	AM
Kissel 6-73	3260	117	Own	V	Leech	L	6	2⅞x4¾	185	5.15	19.8	70@3500	*Alum	4	AC	Gas	Sch	AC
Kissel 8-95	3495	126	Own	V	Leech	L	8	2⅞x4¾	246	5.15	26.5	95@3400	*Alum	5	AC	Gas	Sch	AC
Kissel 8-126	4450	132-139	Own	V	Leech	L	8	3¼x4½	298	5.35	33.8	126@3600	*Alum	5	AC	Gas	Sch	AC
La Salle	4645	*201	Own	V	Yes	LV	8	3 5/16x4 13/16	340	4.7	35.1	90@3000	CI	3	AC	Gas	Own	—
Lincoln	5030	136	Own	V	——	L	8	3½x5	384	4.8	39.2	90@2800	Alum	5	Yes	Own	Str	Un
Marmon Eight 69	3103	*180	Own	V	——	L	8	2 13/16x4¼	211.2	5.50	25.4	84@3400	Alum	5	AC	AC	Sch	AC
Marmon Eight 79	4028	*191	Own	V	——	L	8	3 1/16x4⅝	303.2	5.50	32.5	110@3400	Alum	5	AC	AC	Sch	AC
Marmon Big Eight	4363	*202	Own	V	——	L	8	3¼x4⅝	315.2	5.50	33.8	125@3400	Alum	5	AC	AC	Sch	AC
Marmon-Roosevelt	2833	*172	Own	V	Yes	L	8	2⅞x4¼	201.9	5.25	24.2	77@3400	Alum	5	—	—	Str	AC
Marquette 30	3076	114	Own	V	Yes	L	6	3⅛x4⅝	212.8	5.2	23.4	67½@3000	CI	4	AC	AC	Mar	AC
Nash Single Six	2850	114¼	Own	V	Pines	L	6	3⅛x4⅜	201.3	5.00	23.4	60@2800	*Alum	7	AC	AC	Car	AC
Nash Twin Ig. 6	3535	118-128¼	Own	V	Pines	L	6	3⅜x4½	242	5.00	27.3	74@2800	*Alum	7	AC	AC	Mar	AC
Nash Twin Ig. 8	4000	124-133	Own	V	Pines	L	8	3¼x4½	298.6	5.25	33.8	100@3200	*Alum	9	AC	AC	Mar	AC
Oakland V-8	3095	117	Own	V	Yes	H	8	3 1/16x3⅜	251.0	5.10	37.8	85@3200	CI	3	—	AC	Mar	AC
Oldsmobile	2940	113½	Own	V	——	L	6	3 1/16x4⅛	197.5	5.2	24.4	62@3000	CI	4	AC	AC	John	AC
Packard 726-733	4255	127½-134½	Own	V	Own	L	8	3 1/16x5	320	—	32.5	90@3200	Alum	9	Yes	Yes	Own	Own
Packard 740-745	4560	140½-145½	Own	V	Own	L	8	3½x5	384.8	—	39.2	106@3200	*Alum	9	Yes	Yes	Own	Own
Peerless St. 8	3642	118	Own	V	Yes	L	8	2⅞x4¾	246.0	5.1	26.45	85@3200	*Alum	5	—	AC	Sch	AC
Peerless Master 8	4521	125	Own	V	Yes	L	8	3⅜x4½	322	5.0	36.4	115@3200	*Alum	5	Yes	AC	Sch	AC
Peerless Custom 8	4800	138	Own	V	Yes	L	8	3⅜x4½	322	5.0	36.4	120@3200	*Alum	5	Yes	AC	Sch	AC
Pierce-Arrow 132	4523	132	Own	V	Yes	L	8	3⅜x4¾	340	5.0	36.45	115@3000	*Alum	9	Yes	Yes	Str	Yes
Pierce-Arrow 139	4713	139	Own	V	Yes	L	8	3½x4¾	366	5.0	39.2	125@3000	*Alum	9	Yes	Yes	—	Yes
Pierce-Arrow 126	4831	144	Own	V	Yes	L	8	3½x5	385	5.0	39.2	132@3000	*Alum	9	Yes	Yes	—	Yes
Pierce-Arrow 125	4304	134	Own	V	Yes	L	8	3½x4¾	366	5.0	39.2	125@3000	*Alum	9	Yes	Yes	—	Yes
Plymouth	2595	*167	Own	V	——	L	4	3⅝x4¾	196	4.6	21.03	48@2800	Alum	3	—	Yes	Car	—
Pontiac	2695	110	Own	V	Yes	L	6	3 1/16x3⅞	200.0	4.9	26.3	60@3000	S St	3	—	AC	Mar	—
Reo 15	3300	116	Con	V	Yes	L	6	3⅜x4	214.7	5.5	27.3	60@2800	*Alum	7	—	AC	Sch	Un
Reo 20	3700	120	Own	V	Yes	L	6	3⅜x5	268.3	5.3	27.3	80@3200	Alum	7	Han	—	Sch	Un
Reo 25	3795	124	Own	V	Yes	L	6	3⅜x5	268.3	5.3	27.3	80@3200	Alum	7	Han	—	Sch	Un
Ruxton Fr. Wh. Dr.	4000	130	Own	V	Yes	L	8	3 x4¾	268.6	5.09	28.8	100@3400	*Alum	5	Yes	AC	Zen	AM
Studebaker Six	2950	114	Own	V	Yes	L	6	3¼x4⅛	205.3	5.20	25.4	70@3200	CI	4	Yes	Ste	Sch	—
Studebaker Dict. 6	3080	115	Own	V	Yes	L	6	3⅜x4⅛	221.4	4.8	27.0	68@3200	CI	4	Yes	AC	Str	—
Studebaker Dict. 8	3095	115	Own	V	Yes	L	8	3 1/16x3¾	221.0	5.0	30.0	72@3200	*Alum	9	Yes	AC	Str	AM
Studebaker Com. 6	3235	120	Own	V	Yes	L	6	3⅜x4¾	248.3	4.8	27.3	75@3000	CI	4	Han	AC	Str	—
Studebaker Com. 8	3310	120	Own	V	Pines	L	8	3 1/16x4¼	250.4	5.1	30.0	80@3500	*Alum	9	Han	AC	Str	AM
Studebaker Pres. 8	*4110	125-135	Own	V	Pines	L	8	3½x4⅜	337	5.05	39.2	115@3200	*Alum	5	Han	AC	Str	AM
Stutz	4718	134½-145	Own	C	Yes	O	8	3¼x4½	322	5.25	36.5	80@3300	*Alum	9	Wal	Gas	Zen	AM
Viking Eight	3620	125	Own	V	Yes	H	8	3⅜x3¾	259.5	5.1	36.5	81@3200	CI	3	Own	AC	John	AC
Windsor 6-69	3195	120	Con	V	Yes	L	6	2⅞x4¾	185	4.78	19.8	47.5@2600	*Alum	4	AC	—	Str	—
Windsor 6-72	2930	120	Con	V	Yes	L	6	3⅜x4	215	4.94	27.3	66@3200	*Alum	7	AC	—	Str	—
Windsor 6-77	2930	120	Con	V	Yes	L	6	3⅜x4	215	4.94	27.3	66@3200	*Alum	7	AC	—	Str	—
Windsor 8-85	3600	125	Con	V	Yes	L	8	3 x4¾	269	5.0	28.8	88@3200	*Alum	5	AC	Gas	Str	AM
Windsor 8-92	3600	125	Con	V	Yes	L	8	3 x4¾	269	5.0	28.8	88@3200	*Alum	5	AC	Gas	Str	AM
Whippet 96 A	2412	103¼	Own	V	No	L	4	3⅛x4¾	145.7	5.4	15.6	40@3200	*Alum	3	No	No	Til	No
Whippet 98 A	2693	112½	Own	V	Var	L	6	3¼x3 7/8	178.3	5.12	23.4	50@3000	*Alum	7	No	Til	Til	Til
Willys Six 98-B	2641	110	Own	V	Var	L	6	3¼x3 7/8	193	5.56	25.3	65@3400	CI	4	No	Til	Til	Til
Willys 8-80	3114	120	Con	V	Yes	L	8	3¼x4	245.4	5.4	31.25	80@3200	CI	5	—	Til	Til	Til
Willys-Knt. 66-B	3934	120	Own	V	Var	K	6	3⅜x4¾	255	5.5	27.3	87@3200	*Alum	7	Ski	Til	Til	Til
Willys-Knt. 70-B	2973	112½-115	Own	V	Var	K	6	2 13/16x4¾	177.9	5.5	20.7	53@3000	*Alum	7	Ski	Til	Til	Til

ABBREVIATIONS

Weight—*On Studebaker 135-in. wheel base 4,305 pounds.

Wheel Base—*Over all length of chassis instead of wheel base.

Engine Make—Con, Continental; Lyc, Lycoming.

Fan Belt Type—V, V-type; F, flat; C, cone.

Thermostat—Bish-Bab, Bishop & Babcock; Leech, Leech Fulton; Pines, Pines Winterfront; Var, Various makes.

Valve Arrangement—L, L head; H, horizontal; O, overhead; K, sleeve valve. *Air cooled. †Thermo Syphon water circulation.

Piston Material—*Alum, aluminum with invar struts; Alum, aluminum alloy; CI, cast iron; S St, semi steel.

Oil Purifier—Pur, Purolator; Wal, Wall; Han, Handy; AC, AC Spark Plug Company; Ski, Skinner; Ste, Stewart-Warner.

Fuel Cleaner—AC, AC Spark Plug Company; Gas, Gascolator; Ste, Stewart-Warner; Til, Tillotson.

Carburetor—Sch, Wheeler Schebler; Zen, Zenith; Mar, Marvel; Car, Carter; Str, Stromberg; DL, Detroit Lubricator; John, Johnson; Til, Tillotson.

Air Cleaner—AC, AC Spark Plug Company; AM, Air Muse; Un, United; Han, Handy; Til, Tillotson.

Front End Drive—Link, Link Belt; Tex, Textolite; Cel, Celeron; Ram, Ramsey; Whit, Whitney Chain; Diam, Diamond Chain; Var, Various makes of chains; Var-G, Various makes of gears.

Ignition, Generator and Starter—Aut-L, Auto-Lite; Del-R, Delco-Remy; N E, North East; Dyn, Dyneto. *Bendix starter drive used.

Clutch—Borg, Borg & Beck; Br-L, Brown-Lipe; Rock, Rockford Machine; Russ, Russell; Long, Long Clutch Co.

Gearset—War G, Warner Gear Company; Detr, Detroit Gear; Mun, Muncie Gear. *Three or four speed gear sets as shown are available for either model; WC, Warner Corp.

Universals—Un P, Universal Products Company; Spic, Spicer Mfg. Corporation; M M, Mechanics Machine; Cle, Cleveland; Fab, Fabric.

Rear Axle—Col, Columbia; Sal, Salisbury; Cla, Clark Equipment Company; Tim, Timken.

Steering Gear—Gem, Gemmer; Ross Gear and Tool Company; Sag, Saginaw; War, Warbler.

Brakes—H, hydraulic; M, mechanical; SD, steeldraulic; Bendix, Bendix Brake Corporation. *Bendix front; own rear.

Rear Springs—S, semi-eliptic; El, full eliptic.

Spring Shackles—Tryon, Tryon Spring Shackle Company; Rub B, rubber block;

OF PRESENT AMERICAN PASSENGER CAR MODELS

Make and Model	Front End Drive	Ignition System	Gen. and Starter	Clutch	Gear Set and Speeds	Universals	Rear Axle	Ratio	Brakes	Steering Gear	Springs Rear	Spring Shackles	Chassis Lubric.	Tires
Auburn 6-85	Link	Del-R	*Del-R	Long	War 3	Un P	Col ½	4.9	H	Ross	S 56¾	Own	Bijur	18x5.50
Auburn 8-95	Link	Del-R	*Del-R	Long	War 3	Un P	Col ½	4.7	H	Ross	S 56¾	Own	Bijur	18x6.00
Auburn 125	Link	Del-R	*Del-R	Long	Detr 3	Un P	Col ½	4.45	H	Ross	S 56¾	Own	Bijur	18x6.50
Blackhawk 6	Link	Del-R	Del-R	Borg	Detr 4	Un P	Sal ½	4.75	H	Gem	S 60	Own	Bijur	31x6.00
Blackhawk 8	Link	Del-R	*Del-R	Borg	Detr 4	Un P	Sal ½	†4.75	H	Gem	S 60	Own	Bijur	31x6.00
Buick 40	Tex	Del-R	Del-R	Own	Own 3	Own	Own ¾	4.54	M	Sag	S 55	Own	Al-Z	29x5.50
Buick 50 and 60	Tex	Del-R	Del-R	Own	Own 3	Own	Own ¾	4.45	M	Sag	S 58½	Own	Al-Z	19x6.50
Cadillac 353	Chain	Del-R	Del-R	Own	Own 3	Spic	Own ¾	5.08	Own-M	Own	S 60	Own	Alem	19x7.00
Cadillac 452	Chain	Del-R	Del-R	Own	Own 3	Spic	Own ¾	4.39	Own	Own	S 60	Own	Alem	19x7.00
Chevrolet	Var	Del-R	*Del-R	Own	Own 3	Own	Own ½	3.82	M	Own	S 54	Tryon	Alem	19x4.75
Chrysler 6	Chain	Del-R	Del-R	Own	Own 3	Un P	Own ½	4.7	H	War	S 53⅜	Tryon	——	19x5.00
Chrysler 77	Chain	Del-R	Del-R	Own	Own 4	Un P	Own ½	3.82	H	Ross	S 58¼	Rub B	Al-Z	18x6.00
Chrysler 70	Chain	Del-R	Del-R	Own	Own 4	Un P	Own ½	3.82	H	War	S 57¾	Rub B	Al-Z	18x5.50
Chrysler 66	Chain	Del-R	Del-R	Own	Own 3	Un P	Own ½	4.70	H	War	S 54⅝	Rub B	Alem	18x5.50
Chrysler Imperial	Chain	Del-R	Del-R	Own	Own 4	Un P	Own ½	3.77	H	Ross	S 58⅞	Rub B	Al-Z	18x7.00
Cord (Fr. Wh. Dr.)	Link	Del-R	*Del-R	Long	Det 3	UnP&MM	Col F	4.41	H	Gem	S 62	Own	Bijur	18x7.00
De Soto 6	Chain	Del-R	*Del-R	Borg	Own 3	Un P	Own ½	4.7	H	War	S 53¾	Tryon	Al-Z	19x5.00
De Soto 8	Chain	Del-R	Del-R	Borg	Own 3	Un P	Own ½	4.9	H	War	S 54⅝	Rub B	Al-Z	19x5.25
Dodge Six	Chain	Del-R	*Del-R	Borg	Own 3	Spic	Own ½	4.72	H	Gem	S 54	Own	Al-Z	19x5.50
Dodge Senior	Chain	Del-R	*Del-R	Borg	Own 4	MM	Own ½	4.45	H	Gem	S 55½	Own	Al-Z	19x6.00
Dodge Six D D	Chain	Del-R	Del-R	Borg	Own 3	Un P	Own ½	4.9	H	War	S 53¾	Tryon	Al-Z	19x5.00
Dodge 8	Chain	Del-R	Del-R	Borg	Own 3	Un P	Own ½	4.6	H	War	S 54⅝	Rub B	Al-Z	18x5.50
Durant 6-14	Chain	Aut-L	*Aut-L	Borg	Own 3	Spic	Own ½	4.4	S D	Own	S 55	Tryon	Alem	29x5.00
Durant 6-17	Chain	Aut-L	*Aut-L	Borg	Own 4	Spic	Own ½	3.72	S D	Own	S 55	Tryon	Alem	29x5.50
Elcar 6-75	Link	Del-R	*Del-R	Long	War-G 3	Spic	Sal ½	4.88	H	Ross	S 53½	Belf	Alem	29x5.00
Elcar 140 and 130	Link	Del-R	*Del-R	Long	War-G 4	Spic	Sal ½	...	H	Ross	S 57	Belf	Alem	30x7.00
Elcar 8-95-96	Link	Del-R	*Del-R	Long	War-G 3	Spic	Sal ½	4.90	H	Ross	S 56	Belf	Alem	29x5.50
Essex	Chain	Aut-L	*Aut-L	Own	Own 3	Spic	Own ½	5.4	Bendix	Gem	S 54⅝	Own	Alem	19x5.00
Ford A	Cel	Own	*Own	Own	Own 3	Own	Own ¾	3.7	M	Gem	S Tr	Own	Al-Z	19x4.75
Franklin 145	Ram	Del-R	*Del-R	Br-L	*Detr 4	Spic	Own ½	4.54	H	Gem	El 42	None	Al-Z	19x6.50
Franklin 147	Ram	Del-R	*Del-R	Br-L	War-G 3	Spic	Own ½	4.54	H	Gem	El 42	None	Al-Z	19x6.50
Gardner 136	Link	Del-R	*Del-R	Borg	War-G 4	Spic	Col ½	4.45	H	Ross	S 54	O-N	Alem	29x5.50
Gardner 140	Link	Del-R	*Del-R	Borg	War-G 3	Spic	Col ½	4.45	H	Ross	S 54	O-N	Alem	29x5.50
Gardner 150	Link	Del-R	*Del-R	Borg	War-G 3	Spic	Col ½	4.45	H	Ross	S 57	O-N	Alem	30x6.50
Graham Std 6	Link	Del-R	*Del-R	Long	War-G 3	Un P	Cla ½	4.7	H	Ross	S 54	Tryon	Al-Z	19x5.00
Graham Spl. 6	Link	Del-R	*Del-R	Long	War-G 4	Un P	Sal ½	3.91	H	Ross	S 54	Tryon	Al-Z	18x5.50
Graham Std. 8	Link	Del-R	Del-R	Long	W C 3	Un P	Sal ½	4.45	H	Ross	S 56	Rub B	Al-Z	18x6.00
Graham Spl. 8	Link	Del-R	Del-R	Long	War-G 4	Un P	Sal ½	3.90	H	Ross	S 56	Rub B	Al-Z	18x6.00
Graham Cust. 8	Link	Del-R	Del-R	Long	War-G 4	Un P	Cla ½	3.64	H	Ross	S 58	Own	Bijur	19x6.50
Graham Cust. 8	Link	Del-R	Del-R	Long	War-G 4	Un P	Cla ½	3.92	H	Ross	S 58	Own	Bijur	19x6.50
Hudson Super 8	Chain	Aut-L	*Aut-L	Own	Own 3	Spic	Own ½	4.6	Bendix	Gem	S 54⅝	Own	Alem	18x5.50
Hupmobile S	Chain	Aut-L	*Aut-L	Borg	Detr 3	M M	Sal ½	4.7	S D	Ross	S 53	Tryon	Alem	29x5.25
Hupmobile C	Chain	Aut-L	*Aut-L	Long	Detr 3	Un P	Own ½	4.36	S D	Ross	S 54	Own	Alem	31x6.00
Hupmobile H	Chain	Aut-L	*Aut-L	Long	Detr 3	Un P	Own ½	4.07	S D	Ross	S 57	Own	Alem	19x6.50
Jordan St. Line 80	Chain	Aut-L	*Aut-L	Long	War-G 3	Cle	Col ½	4.9	H	Gem	S 55¾	O-N	Alem	28x5.50
Jordan Grt. Ninety 8	Chain	Aut-L	*Aut-L	Long	War-G 3	Cle	Col ½	4.25	H	Gem	S 55¾	O-N	Alem	30x6.00
Kissel 6-73	Link	Del-R	*Del-R	Borg	War-G 3	MM	Col ½	4.89	H	Ross	S 57	Rub B	Alem	30x6.00
Kissel 8-95	Link	Del-R	*Del-R	Borg	War-G 4	MM	Col ½	3.92	H	Ross	S 57	Rub B	Alem	30x6.00
Kissel 8-126	Link	Del-R	*Del-R	Borg	War-G 4	MM	Tim ½	4.09	H	Ross	S 60	Rub B	Alem	30x7.00
La Salle 340	Chain	Del-R	Del-R	Own	Own 3	Spic	Own ¾	4.54	Own-M	Own	S 58	Own	Alem	19x6.50
Lincoln	Chain	Del-R	Del-R	Own	Own 3	Spic	Tim F	4.58	Bendix	Gem	S 60	Own	Alem	20x7.00
Marmon Eight-69	Diam	Del-R	*Del-R	Rock	War-G 3	Spic	Sal ½	4.9	Bendix	Ross	S 56⅞	Rub B	Al-Z	29x5.50
Marmon Eight-79	Diam	Del-R	*Del-R	Rock	Detr 3	Spic	Sal ½	4.7	Bendix	Ross	S 60	Rub B	Al-Z	31x6.00
Marmon Big 8	Diam	Del-R	*Del-R	Rock	War-G 4	Spic	Sal ½	4.45	Bendix	Ross	S 60	Rub B	Al-Z	31x6.50
Marmon-Roosevelt	Diam	Del-R	*Del-R	Rock	War-G 3	Spic	Sal ½	4.9	Bendix	Ross	S 54⅛	Tryon	Al-Z	29x5.50
Marquette 30	Link	Del-R	Del-R	Borg	Mun 3	MM	Own ½	4.54	M	Sag	S 54½	Tryon	Al-Z	28x5.25
Nash Single Six	Cel	Aut-L	*Aut-L	Borg	Own 3	Fab	Own ½	4.7	S D	Ross	S 50⅞	Tryon	Alem A	29x5.00
Nash Twin Ig. 6	Cel	*Aut-L	*Aut-L	Borg	Own 3	Own	Own ½	4.5	Bendix	* Gem	S 54	Own	Bijur	29x5.50
Nash Twin Ig. 8	Diam	*Aut-L	*Aut-L	Borg	Own 3	Own	Own ½	4.5	Bendix	Gem	S 56¾	Own	Bijur	31x6.50
Oakland V-8	Chain	Del-R	Del-R	Own	Own 3	MM	Own ½	4.42	M	Sag	S 54½	Tryon	Al-Z	28x5.50
Oldsmobile	Var	Del-R	Del-R	Borg	Mun 3	Un P	Own ½	4.54	Own	Sag	S 54½	Tryon	Alem	28x5.25
Packard 726-733	Chain	N E	*Dyn	Own	Own 4	MM	Own ½	4.38	Bendix	Own	S 56	Own	Cen	*20x6.00
Packard 740-745	Chain	N E	*Dyn	Own	Own 4	MM	Own ½	4.38	Bendix	Own	S 62	Own	Cen	19x7.00
Peerless St. 8	Link	Aut-L	Aut-L	Rock	War-G 3	Spic	Sal ½	4.7	Bendix	Ross	S 56⅞	Rub B	Alem	29x5.50
Peerless Master 8	Link	Aut-L	*Aut-L	Rock	War-G 4	Spic	Sal ½	4.45	Bendix	Ross	S 60	Rub B	Alem	31x6.00
Peerless Custom 8	Link	Aut-L	*Aut-L	Rock	War-G 4	Spic	Sal ½	4.45	Bendix	Ross	S 60	Rub B	Alem	31x6.50
Pierce-Arrow 132	Chain	Del-R	Del-R	Long	Own 4	Spic	Own ½	4.58	Bendix	Gem	S 60	Faf	Alem	19x6.50
Pierce-Arrow 139	Chain	Del-R	Del-R	Long	Own 4	Spic	Own ½	4.42	Bendix	Gem	S 60	Faf	Alem	18x7.00
Pierce-Arrow 126	Chain	Del-R	Del-R	Long	Own 4	Spic	Own ½	4.42	Bendix	Gem	S 60	Faf	Alem	18x7.00
Pierce-Arrow 125	Chain	Del-R	Del-R	Long	Own 4	Spic	Own ½	4.08	Bendix	Gem	S 60	Faf	Alem	18x7.00
Plymouth	Cel	Del-R	*Del-R	Rock	Own 3	Own	Own ½	4.3	H	War	S 53⅜	Tryon	Al-Z	19x4.75
Pontiac	Chain	Del-R	Del-R	Own	Own 3	MM	Own ½	4.42	M	Sag	S 54	Tryon	Al-Z	29x5.00
Reo 15	Link	Del-R	Del-R	Borg	War-G 3	Spic	Sal ½	4.45	H	Ross	S 56⅜	Rub B	Al-Z	18x5.50
Reo 20	Chain	Del-R	Del-R	Russ	Own 3	Detr	Own ½	4.07	H	Ross	S 55	Rub B	Alem	18x6.00
Reo 25	Chain	Del-R	Del-R	Long	Own 3	Detr	Own ½	4.42	H	Ross	S 55	Rub B	Al-Z	18x6.50
Ruxton (Fr. Wh. Dr.)	Link	Aut-L	Aut-L	Long	Own 3	Own	Own	4.25	H	Gem	S 55	Own	Alem	31x6.00
Studebaker Six	Whit	Del-R	*Del-R	Long	War-G 3	Spic	Own ½	4.78	Bendix	Ross	S 54	Tryon	Alem	19x5.25
Studebaker Dict. 6	Whit	Del-R	Del-R	Long	War-G 3	Spic	Own ½	4.78	Bendix	Ross	S 54	Own	Alem	19x5.50
Studebaker Dict. 8	Var G	Del-R	Del-R	Long	War-G 3	Spic	Own ½	5.11	Bendix	Ross	S 54	Own	Al-Z	19x5.50
Studebaker Com. 6	Whit	Del-R	Del-R	Long	War-G 3	Spic	Own ½	3.91	Bendix	Ross	S 54	Faf	Al-Z	19x5.50
Studebaker Com. 8	Var G	Del-R	Del-R	Long	War-G 3	Spic	Own ½	4.7	Bendix	Ross	S 54	Faf	Al-Z	19x5.50
Studebaker Pres. 8	Var G	Del-R	Del-R	Long	Own 3	Spic	Own ½	4.31	Bendix	Ross	S 60	Faf	Al-Z	*20x6.00
Stutz M	Link	Del-R	Del-R	Borg	Detr 4	MM	Tim ½	4.5	H	Gem	S 62¼	Own	Bijur	32x7.00
Viking Eight	Whit	Del-R	Del-R	Borg	Mun 3	MM	Own ¾	4.63	Bendix	Sag	S 58	Tryon	Alem	30x6.00
Windsor 6-69	Chain	Aut-L	*Aut-L	Borg	War-G 3	MM	Col ½	4.9	H	Ross	S 54	O-N	Alem	29x5.25
Windsor 6-72	Link	Del-R	*Del-R	Borg	War-G 3	MM	Col ½	4.9	H	Ross	S 54	O-N	Alem	29x5.50
Windsor 6-77	Link	Del-R	*Del-R	Borg	War-G 4	MM	Col ½	3.9	H	Ross	S 54	O-N	Alem	29x5.50
Windsor 8-85	Link	Del-R	*Del-R	Borg	War-G 3	MM	Col ½	4.63	H	Ross	S 54	Own	Alem	31x6.00
Windsor 8-92	Link	Del-R	*Del-R	Borg	War-G 4	MM	Col ½	3.9	H	Ross	S 54	Own	Alem	31x6.50
Whippet 96 A	Chain	Aut-L	*Aut-L	Borg	Own 3	MM	Own ½	4.55	*Bendix	Own	S 49½	Tryon	Alem	19x4.75
Whippet 98 A	Chain	Aut-L	*Aut-L	Rock	Own 3	MM	Own ½	4.55	*Bendix	Own	S 53	Tryon	Alem	19x5.00
Willys-Six 98 B	Chain	Aut-L	*Aut-L	Borg	Own 3	MM	Own ½	4.09	Bendix	Own	S 49¾	Tryon	Alem	19x5.00
Willys 8-80	Chain	Aut-L	Aut-L	Borg	Own 3	MM	Own ½	4.4	Bendix	Ross	S	Tryon	Alem	19x5.50
Willys-Knight 66 B	Chain	N E	*N E	Rock	Own 3	MM	Own ½	4.6	Bendix	Ross	S 57½	Own	Bijur	19x6.00
Willys-Knight 70 B	Link	Aut-L	*Aut-L	Rock	Own 3	MM	Own ½	4.89	*Bendix	Own	S 53	Tryon	Alem	19x5.50

Chain: Faf, Fafnir; O-N, Henry Mfg. Co., Moline, Ill.; Belf, Belflex Corp.

Chassis Lubricator—Alem, Alemite; Al-Z, Alemite Zerk; Alem A, Alemite automatic; Bijur, Bijur chassis lubricator; Cen, central magazine.

Tires—*Studebaker 135-in. chassis 19x6.50. *Packard 733 cars equipped with 6.50x20.

CLASSIFIED ADVERTISEMENTS IN THE AUTOMOTIVE DAILY NEWS BRING RESULTS

New Dealers Appointed

CANADA

Graham-Paige—W. H. Huffman, Bridgeburg, Ont.; J. Milton Wheatley, Charlottetown, P. E. I.; Jerry Page and Son, Chrysler, Ont.; John Rousch, Naicam, Sask.; Standard Garage, Orillia, Ont.; Emile Perron, Valleyfield, Que.; Joseph Jagelewski, Walkerton, Ont.; Fagan Motor Sales, Collingwood, Ont.; McLellan Brothers, Wadena, Sask.

Nash—Smith & Pitcher, Cardston, Alta.; N. E. Blaxall, Magrath; Thomas A. Ward, Kenora, Ont.; F. J. Coatec, Milk River, Alta.; Samuel Fisk, Walkerton, Ont.; Ryder Nash Motors, Kapuskasing, Ont.; E. D. Whinnery, Granum, Alta.

Reo—Nanton Garage and Machine Shop, Ltd., Nanton, Alta.; Johnston Brothers, Vulcan, Alta.; Queenstown Garage, Queenstown, Alta.; Fisher Brothers, Bellevue, Alta.; H. J. Roelofs, Monarch, Atla.; Union Motors, Stavely, Alta.; Alfred Sevigny, St. George, Que.; Little & Pollock, Kirkland Lake, Ont.; Begin Motor Sales, Thetford Mines, Que.; W. J. McKenzie, Charesholm, Atla.

ALABAMA

Graham-Paige—L. H. Penntington Company, Inc., Ensley.

MEASURING ENGINE ACCELERATION TOLD

(Continued from page 10)

shown to be qualitatively independent of engine design.

5. The effects on acceleration of increasing (a) the heat applied to the manifold, (b) the fuel volatility, (c) the accelerating charge, are similar, all three acting to increase the acceleration at low engine speeds. However, if the supplied mixture is as rich as that which gives maximum power, heating the manifold or increasing the volatility of the fuel will increase the acceleration at low speeds, but will decrease it at higher speeds.

6. By properly proportioning the quantity and rate of injection of the accelerating charge, together with use of the carburetor setting giving maximum power at constant speed operation, it is possible to realize practically the computed maximum acceleration over the entire speed range.

7. The total induction system surface to be wetted is a determining factor in fixing the amount of accelerating charge required to produce optimum acceleration performance, and therefore, when no accelerating charge is used, in limiting the acceleration performance.

13 See The Journal, April 1930, page 474.
14 See The Journal, September 1928, pages 240-241.
15 See The Journal, April 1930, page 471.

CAR EXPORTS TO LATIN AMERICAS TO INCREASE

Detroit, May 29.—The automobile export trade of the United States with South American countries is firmly established, and while conditions at present are a little below normal, due to political and economic situations of a temporary nature, there is every reason to believe that the United States will retain its ascendancy in this field, and that American-made cars will continue to outsell all others in the countries to the south.

This is the opinion of Walter R. Glennie, export sales manager of the Graham-Paige Motors Corporation, who has recently returned after an extended trip through South American countries. Mr. Glennie visited Graham dealers in the principal cities of Argentina, Brazil, Chile, Peru, Paraguay and Uraguay.

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MAINTENANCE PROFIT ISSUES—June 24-25-26

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